

**Annual Report to Congress
on Federal Government
Energy Management and
Conservation Programs
Fiscal Year 1999**

January 11, 2001

**U.S. Department of Energy
Assistant Secretary, Energy Efficiency and Renewable Energy
Federal Energy Management Program
Washington, DC 20585**

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
I. OVERVIEW OF FEDERAL ENERGY MANAGEMENT ACTIVITIES ..	7
A. Overview of Federal Energy Management Policy and Legislative Mandates	7
B. Overall Federal Energy Consumption, Costs, and Carbon Emissions ...	10
C. Federal Coordination	17
D. Personnel and Energy Awareness Activities	19
- Training	19
- Recognition	20
- Energy Awareness	24
- Federal Energy Saver Showcase Facilities	25
E. Funding for Energy Efficiency in Buildings and Facilities	26
- Direct Appropriations	26
- Federal Energy Efficiency Fund	30
- Energy Savings Performance Contracting	32
- Utility Partnerships	37
F. Life-Cycle Costing (LCC)	37
G. Procurement Policy	38
H. Public Education Programs	39
II. ENERGY MANAGEMENT IN BUILDINGS AND FACILITIES	43
A. Energy Consumption and Costs for Buildings and Facilities	43
B. Progress Toward the Mandated Goals for Buildings and Facilities	51
C. ENERGY STAR® Program Participation	56
D. Federal Building Energy Performance Standards	58
III. ENERGY INTENSIVE OPERATIONS IN FEDERAL FACILITIES	60
A. Energy Consumption and Costs for Energy Intensive Operations	60
B. Statutory Background and Progress Toward Goals for Industrial Facilities	64
IV. ENERGY MANAGEMENT IN VEHICLES AND EQUIPMENT	67
A. Energy Consumption and Costs for Vehicles and Equipment	67
B. Alternative Fuel Vehicles	72
V. FEDERAL AGENCY ENERGY MANAGEMENT ACTIVITIES	75
1. Department of Agriculture	75
2. Department of Commerce	78
3. Department of Defense	80
4. Department of Energy	87
5. Department of Health and Human Services	93
6. Department of Housing and Urban Development	99
7. Department of the Interior	101

8.	Department of Justice	106
9.	Department of Labor	109
10.	Department of State	111
11.	Department of Transportation	114
12.	Department of the Treasury	116
13.	Department of Veterans Affairs	118
14.	Environmental Protection Agency	120
15.	General Services Administration	123
16.	National Aeronautics and Space Administration	127
17.	National Archives and Records Administration	131
18.	Nuclear Regulatory Commission	132
19.	Railroad Retirement Board	134
20.	Social Security Administration	135
21.	Tennessee Valley Authority	139
22.	United States Postal Service	142

TABLES

Table 1-A	Total Primary Energy Consumption By Federal Agencies	11
Table 1-B	Total Net Energy Consumption By Federal Agencies	12
Table 2	Federal Petroleum Usage in FY 1999	15
Table 3-A	Agency Expenditures for Energy Conservation Retrofits and Capital Equipment, FY 1985 through FY 1999 (Thousands of Nominal Dollars)	27
Table 3-B	Agency Expenditures for Energy Conservation Retrofits and Capital Equipment, FY 1985 through FY 1999 (Thousands of Constant 1999 Dollars)	28
Table 4-A	Federal Primary Energy Consumption in Buildings and Facilities	44
Table 4-B	Federal Net Energy Consumption in Buildings and Facilities	45
Table 5	Petroleum-Based Fuel Consumption in Buildings and Facilities	48
Table 6-A	Defense and Civilian Federal Costs for Buildings Energy in FY 1999 ..	49
Table 6-B	Consumption and Costs of Federal Buildings Energy by Fuel Type in FY 1999, FY 1998, and FY 1985	50
Table 7-A	Federal Buildings and Facilities Net Energy Use Per Gross Square Foot, FY 1985 and FY 1999	53
Table 7-B	Federal Buildings and Facilities Primary Energy Use Per Gross Square Foot, FY 1985 and FY 1999	54
Table 8	Federal Net Energy Consumption in Excluded Buildings/ Process Operations	61
Table 9	Defense and Civilian Federal Costs for Excluded Buildings/ Process Energy in FY 1999	63
Table 10	Federal Energy Consumption in Vehicle and Equipment Operations ...	68
Table 11-A	Defense and Civilian Federal Costs for Vehicle and Equipment Energy in FY 1999	70

Table 11-B	Consumption and Costs of Vehicle and Equipment Energy by Fuel Type in FY 1999, FY 1998, and FY 1985	71
Table C	Federal Energy Expenditures, FY 1985 through FY 1999	C-2

FIGURES

Figure ES-1	Decrease in Btu per Gross Square Foot in Federal Buildings and Facilities from FY 1985	4
Figure ES-2	Federal Consumption of Petroleum-Based Fuels FY 1985 through FY 1999	5
Figure 1	Federal Energy Consumption, FY 1999	13
Figure 2	Federal Energy Costs, FY 1999	14
Figure 3	Carbon Emissions from Federal Energy Consumption, FY 1990 to FY 1999	16
Figure 4	Energy Conservation Retrofit Expenditures	29
Figure 5	Defense and Civilian Energy Consumption in Buildings and Facilities by Fuel Type, FY 1999	43
Figure 6	Consumption of Electricity and Other Fuels in Buildings and Facilities, FY 1985 through FY 1999	46
Figure 7	Energy Costs (Constant 1999 Dollars) in Buildings and Facilities, FY 1985 through FY 1999	47
Figure 8	Progress Toward the Energy Reduction Goals for Federal Buildings and Facilities, FY 1985 through FY 1999	51
Figure 9	Range of Energy Intensity (Btu/GSF) in Buildings and Facilities by Agency in FY 1999	56
Figure 10	Defense and Civilian Federal Energy Consumption in Vehicles and Equipment by Fuel Type, FY 1999	69

APPENDICES

Appendix A	List of Authorities	A-1
Appendix B	Data Collection	B-1
Appendix C	Federal Energy Expenditures FY 1985 through FY 1999	C-1
Appendix D	Buildings Exempted From NECPA's Performance Goal in FY 1999 .	D-1
Appendix E	Department of Energy: Education, Extension, and Information Services	E-1
Appendix F	Federal Interagency Energy Policy Committee	F-1
Appendix G	Personnel of the Department of Energy's Federal Energy Management Program	G-1

AGENCY ACRONYMS

Commodity Futures Trading Commission	CFTC
Central Intelligence Agency	CIA
Department of Agriculture	USDA
Department of Commerce	DOC
Department of Defense	DOD
Department of Energy	DOE
Department of Health and Human Services	HHS
Department of Housing and Urban Development	HUD
Department of the Interior	DOI
Department of Justice	DOJ
Department of Labor	DOL
Department of State	ST
Department of Transportation	DOT
Department of the Treasury	TRSY
Department of Veterans Affairs	VA
Environmental Protection Agency	EPA
Equal Employment Opportunity Commission	EEOC
Federal Communications Commission	FCC
Federal Emergency Management Agency	FEMA
Federal Energy Regulatory Commission	FERC
Federal Trade Commission	FTC
General Services Administration	GSA
National Aeronautics and Space Administration	NASA
National Archives and Records Administration	NARA
National Science Foundation	NSF
Nuclear Regulatory Commission	NRC
Office of Personnel Management	OPM
Panama Canal Commission	PCC
Railroad Retirement Board	RRB
Social Security Administration	SSA
Tennessee Valley Authority	TVA
United States Information Agency	USIA
United States Postal Service	USPS

INTERNET WEB SITES CITED IN THIS REPORT

Federal Energy Management Program	www.eren.doe.gov/femp
Energy Efficiency and Renewable Energy Clearinghouse	www.eren.doe.gov
National Energy Information Center	www.eia.doe.gov
Alternative Fuels Data Center	www.afdc.nrel.gov
Clean Cities Program	www.cities.doe.gov

EXECUTIVE SUMMARY

This report on Federal Energy Management for Fiscal Year (FY) 1999 provides information on energy consumption in Federal buildings, operations, and vehicles and equipment, and documents activities conducted by Federal agencies to meet the statutory requirements of Title V, Part 3, of the National Energy Conservation Policy Act (NECPA), as amended, 42 U.S.C. §§ 8251-8259, 8262, 8262b-k, and Title VIII of NECPA, 42 U.S.C. § 8287-8287c. Implementation activities undertaken during FY 1999 by the Federal agencies under the Energy Policy Act of 1992 (EPACT) and Executive Order 12902, Energy Efficiency and Water Conservation at Federal Facilities, are also discussed in this report. On June 3, 1999, President Clinton signed Executive Order 13123, Greening the Government through Efficient Energy Management. Initial activities undertaken to meet the requirements of this Order are discussed in this report, however, FY 2000 will be first full reporting year for Executive Order 13123.

Based on reports submitted to the Department of Energy (DOE) by 29 Federal agencies, the total primary energy consumption of the Government of the United States, including energy consumed to produce, process, and transport energy, was 1.39 quadrillion British Thermal Units (quads) during FY 1999.¹ These 1.39 quads consumed by the Government in buildings and operations to provide essential services to its citizens, including the defense of the Nation, represent approximately 1.5 percent of the total 93.03 quads² used in the United States. In total, the Federal Government is the single largest energy consumer in the Nation, although its pattern of consumption is widely dispersed.

The Government consumed 1.01 quads during FY 1999 when measured in terms of energy actually delivered to the point of use (net energy consumption). Unless otherwise noted, this report uses the site-measured conversion factors to convert common units for electricity and steam to British Thermal Units (Btu). The total net energy consumption in FY 1999 decreased 30.1 percent from the FY 1985 base year. This reduction of 435.7 trillion Btu could satisfy the energy needs of the State of Idaho for more than one year.³ The total cost of the 1.01 quads was almost \$8.0 billion in FY 1999.⁴ This is \$2.9 billion less than the \$10.8 billion reported in

¹Primary energy consumption considers all energy resources used to generate and transport electricity and steam. Tables 1-A, 4-A, and 7-B show primary energy consumption for comparison with net consumption shown in Tables 1-B, 4-B, and 7-A respectively. Conversion factors of 10,346 Btu per kilowatt hour for electricity and 1,390 Btu per pound of steam are used to calculate gross energy consumption.

²DOE/EIA-0035(2000/12), *Monthly Energy Review*, December 2000.

³Based on net energy consumption estimates for 1994 in the residential, commercial, industrial, and transportation sectors (362.4 trillion Btu). Source: DOE/EIA-0214(96), *State Energy Data Report, 1996*, Tables 1 and 8; February 1998.

⁴Unless otherwise noted, all costs cited in this report are in constant 1999 dollars, calculated using Gross Domestic Product implicit price deflators. See DOE/EIA-0384(99), *Annual Energy Review 1999*, Table E 1; July 2000). Costs noted as nominal dollars reflect the price paid at the time of the transaction and have not been adjusted to remove the effect of changes in the spending power of the dollar.

FY 1985, a 26.5 percent⁵ decrease in nominal costs. In constant 1999 dollars, this equates to a decrease of 47.8 percent from \$15.2 billion in FY 1985 to \$8.0 billion in FY 1999, which reflects the reduced energy use and a 25.3 percent reduction in the inflation-adjusted cost of energy per quad. The Federal energy bill for FY 1999 decreased 7.5 percent from the previous year.

Federal agencies report energy consumption under three categories: buildings and facilities, energy intensive operations, and vehicles and equipment.

Buildings and Facilities

In FY 1999, the Federal Government used 336.2 trillion British Thermal Units (Btu) to provide energy to approximately 500,000 buildings and facilities. This consumption represents a 28.4 percent decrease compared to FY 1985 and a 1.1 percent decrease relative to FY 1998. The cost of energy for buildings and facilities in FY 1999 was \$3.4 billion, a decrease of approximately \$124.4 million from FY 1998 expenditures, and a decrease of 39.5 percent from the FY 1985 expenditure of \$5.6 billion.⁶

During FY 1999, Federal agencies had three primary options for financing energy efficiency, water conservation, and renewable energy projects in buildings and facilities: direct appropriated funding, energy savings performance contracts (ESPCs), and utility-sponsored demand side management (DSM) incentives. Known funding from the three sources totaled approximately \$338 million in FY 1999. Direct appropriations accounted for approximately \$205 million. ESPC contracts awarded in FY 1999 resulted in more than \$130 million in estimated contractor investment (at least \$87 million from conventional, site-specific ESPCs and \$44 million from Super ESPC delivery orders), and agencies reported more than \$2.6 million in utility incentives received.

In FY 1999, direct funding identified by agencies for energy conservation retrofits and capital equipment decreased 22.5 percent to \$205.2 million from \$264.7 million dollars in FY 1998.

Energy Intensive Operations

The energy intensive operations category covers energy used in buildings excluded from the 10 and 20 percent reduction goals for buildings and facilities under section 543 of NECPA, 42 U.S.C. §§ 8253(a)(2) and 8253(c). This category includes the energy consumed in industrial operations, certain research and development activities, and electronics-intensive facilities.

In FY 1999, the Federal Government used 68.1 trillion Btu of energy in energy intensive operations, approximately 6.7 percent of the total 1.01 quads consumed. Total energy consumption in this category increased 56.0 percent relative to FY 1985 and decreased 2.5

⁵Calculation of percent changes in this report do not account for rounding of numbers in text.

⁶Cost and consumption figures for FY 1985 may be different from those published in last year's Annual Report since Federal agencies update their files and provide revisions to their data.

percent relative to FY 1998. These increases are the result of changes in reporting procedures by individual agencies as well as changes in agency missions.

The Federal Government spent \$639.7 million on energy intensive operations energy in FY 1999, \$28.2 million less than the FY 1998 expenditure of \$667.9 million constant dollars.

Vehicles and Equipment

The vehicles and equipment category includes aircraft and naval fuels, automotive gasoline, diesel fuel consumed by Federally-owned and leased vehicles and privately-owned vehicles used for official business, and the energy used in Federal construction.

In FY 1999, the Federal Government used approximately 607.5 trillion Btu of energy in vehicles and equipment, nearly 60.0 percent of the total 1.01 quads consumed. Total energy consumption in vehicles and equipment decreased 35.0 percent relative to FY 1985 and was 3.2 percent less than the FY 1998 consumption of 627.3 trillion Btu. The Department of Defense consumed 559.8 trillion Btu or 92.1 percent of all vehicles and equipment energy used by the Federal Government.

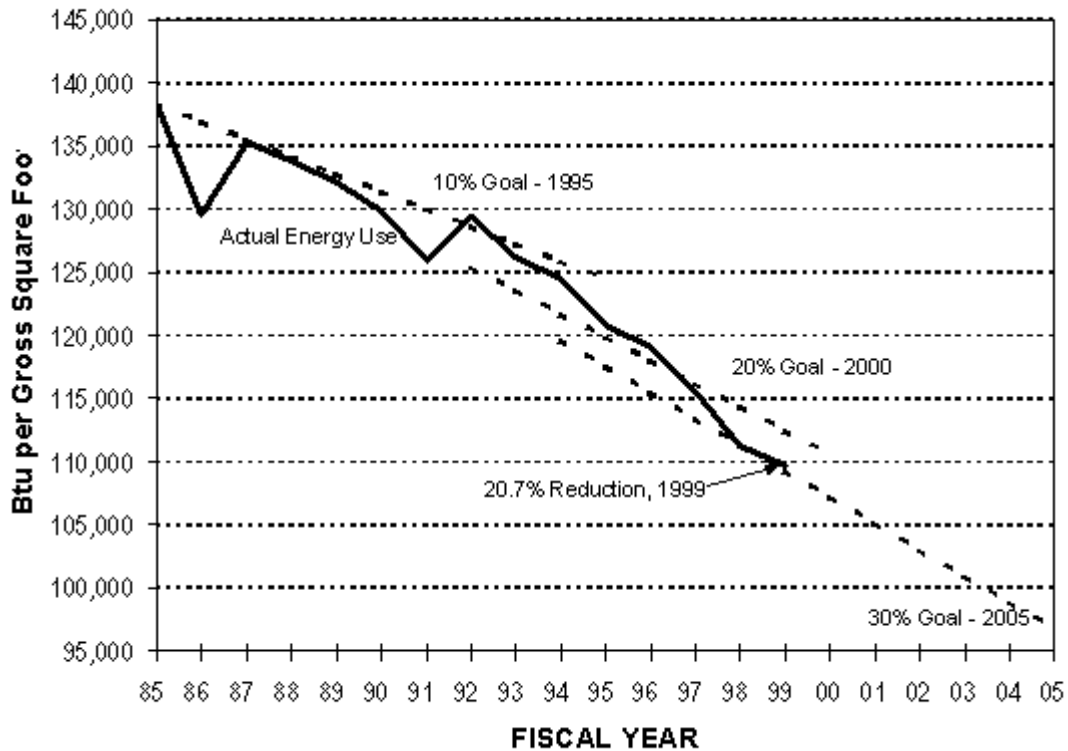
The Federal Government spent \$3.9 billion on vehicles and equipment energy in FY 1999, \$492.4 million less than the FY 1998 expenditure.

Agency Progress in Meeting Energy Reduction Goals

NECPA, as amended by EPACT, requires agencies to take the steps necessary to reduce energy consumption in Federal buildings by 10 percent by 1995 compared to 1985 consumption levels, based on Btu per gross square foot, and requires a 20 percent reduction by 2000 compared to 1985 consumption levels. The 10 percent goal was met by the Government in FY 1995 with a 12.7 percent reduction from FY 1985. Executive Order 12902 added a goal of reducing energy consumption by 30 percent by the year 2005 relative to 1985 consumption levels. Executive Order 13123 adds an additional goal of a 35 percent reduction by 2010, compared to FY 1985. During FY 1999 agencies provided data to DOE that indicated a decrease in energy consumption per gross square foot of 20.7 percent relative to FY 1985. The Government's performance for each year since FY 1985 is illustrated in Figure ES-1. This reduction was the result of significant decreases in the consumption of fuel oil, natural gas, and coal. The use of non-electric fuels in Federal buildings has declined 41.9 percent since 1985, while the consumption of electricity has increased by only 0.8 percent. The installation and increased use of electricity-driven electronic equipment contributed to increases in electricity through the years, peaking in FY 1990 at 12.5 percent above FY 1985. Since FY 1990, electricity consumption has declined 10.4 percent. Electricity now represents about 73.2 percent of the total energy costs of Federal buildings and accounts for 43.3 percent of total net energy consumption in buildings. This is compared to 30.7 percent of the total net energy consumption in buildings in FY 1985.

Agency efforts undertaken in FY 1999 to increase energy efficiency in buildings included:

FIGURE ES-1
Decrease in Btu per Gross Square Foot
in Federal Buildings and Facilities from FY 1985



- improvement of operations and maintenance procedures;
- implementation of no-cost, low-cost efficiency measures;
- energy-efficient building retrofits and capital improvements;
- energy awareness activities and employee training programs; and
- procurement of energy-efficient goods and products.

Executive Order 13123 expands the scope of Federal energy management activities beyond the NECPA mandates by establishing goals for industrial, laboratory, and other energy-intensive facilities. Section 203 of Executive Order 13123 requires agencies, through life-cycle cost-effective measures, to reduce energy consumption per square foot, per unit of production, or per other unit as applicable by 20 percent by 2005 and 25 percent by 2010 relative to 1990.

Procurement of Energy-Efficient Products

Section 507 of Executive Order 12902 requires all Federal agencies to buy “best practice” products when practicable, when they meet the agency’s specific performance requirements, and are cost-effective. Best practice products are those which are in the upper 25 percent of energy efficiency for all similar products, or products that are at least 10 percent more efficient than the minimum level that meets Federal standards. During FY 1999, DOE continued its program to assist agencies in implementing the EPACT and Executive Order requirements for energy

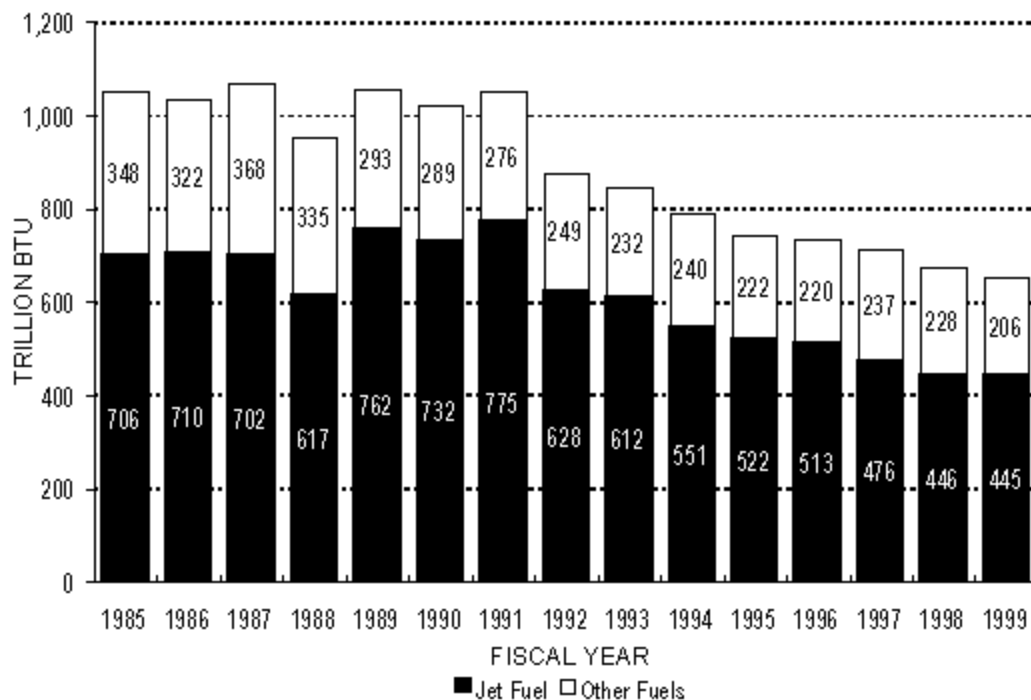
efficient procurement. In 1999, DOE's Federal Energy Management Program (FEMP) produced and distributed seven additional product energy efficiency recommendations to be added to the one-stop shopping guide, *Buying Energy Efficient Products*, to help Federal purchasers identify products which meet the energy efficiency requirements of Executive Order 12902. Since 1996, over 30 product energy efficiency recommendations have been issued.

Reducing Petroleum-Based Fuel Consumption

Effective management of energy resources is of strategic importance to the Federal Government as well as the Nation. In FY 1999, petroleum-based fuels accounted for 0.65 quads of the total 1.01 quads consumed by the Federal Government, with 0.60 quads used by the Department of Defense, primarily for jet fuel and distillate/diesel for vehicles and equipment. The Federal Government consumed 38.3 percent less petroleum-based fuel in FY 1999 than in FY 1985. Figure ES-2 illustrates the trend in the Federal Government's use of petroleum fuels.

Section 205 of Executive Order 13123 directs agencies to minimize the use of petroleum-based fuels in buildings and facilities. Federal agencies have made significant progress in reducing their dependence on petroleum-based fuels in their buildings and facilities. For example, Federal agencies report that in FY 1999, 36.7 trillion Btu of petroleum-based fuels were used for buildings and facilities energy, a 66.8 percent decrease from FY 1985 and a 6.7 percent decrease from FY 1998. This represents 10.9 percent of total buildings and facilities energy consumption.

FIGURE ES-2
Federal Consumption of Petroleum-Based Fuels
FY 1985 through FY 1999



Federal Energy Management Highlights

Progress is being made in increasing Federal energy efficiency, although there remain opportunities for greater efficiency and cost reduction. Several of the most important findings of this report are listed below:

- The overall real cost of energy consumption in the Federal Government measured in constant 1999 dollars has fallen from \$15.2 billion in FY 1985 to \$8.0 billion in FY 1999.
- Total net energy consumption in FY 1999 decreased 30.1 percent from FY 1985.
- Energy consumption in buildings in FY 1999 decreased 28.4 percent from FY 1985.
- On a Btu-per-gross-square-foot basis, the 20.7 percent reduction in buildings energy puts the Federal Government past the 20 percent reduction goal for 2000, one year early.
- Eight agencies, the Departments of Agriculture, Commerce, Energy, Justice, Labor, Transportation, the National Aeronautics and Space Administration, and the Tennessee Valley Authority have surpassed a 20 percent reduction in buildings energy use per gross square foot from 1985.
- Energy consumption in FY 1999 was used for the following purposes:

<i>End Use</i>	<i>Percentage</i>	<i>Cost</i>
Buildings & Facilities	33.3 percent	\$3.4 billion
Energy Intensive Operations	6.7 percent	\$0.6 billion
Vehicles & Equipment	60.0 percent	\$3.9 billion

I. OVERVIEW OF FEDERAL ENERGY MANAGEMENT ACTIVITIES

A. Overview of Federal Energy Management Policy and Legislative Mandates

This report on Federal Energy Management for Fiscal Year (FY) 1999 provides information on energy consumption in Federal buildings and operations and documents activities conducted by Federal agencies to meet the statutory requirements of Title V, Part 3, of the National Energy Conservation Policy Act (NECPA), as amended, 42 U.S.C. §§ 8251-8259, 8262, 8262b-k and Title VIII of NECPA, 42 U.S.C. § 8287-8287c. Implementation activities undertaken during FY 1999 by the Federal agencies under the Energy Policy Act of 1992 (EPACT) and Executive Order 12902, Energy Efficiency and Water Conservation at Federal Facilities, are also described in this report. On June 3, 1999, President Clinton signed Executive Order 13123, Greening the Government through Efficient Energy Management. Initial activities undertaken to meet the requirements of this Order are discussed in this report, however, FY 2000 will be first full reporting year for Executive Order 13123. In compliance with section 381(c) of the Energy Policy and Conservation Act (EPCA), as amended, 42 U.S.C. § 6361c, this report also describes the energy conservation and management activities of the Federal Government under the authorization of section 381 of EPCA, 42 U.S.C. § 6361.

Requirements of National Energy Conservation Policy Act (NECPA) and Energy Policy Act of 1992 (EPACT)

NECPA provides major policy guidance to Federal agencies to improve energy management in their facilities and operations. Amendments to NECPA made by the Federal Energy Management Improvement Act of 1988, 42 U.S.C. § 8253 (a)(1), required each agency to achieve a 10 percent reduction in energy consumption in its Federal buildings by FY 1995, when measured against a FY 1985 baseline on a Btu-per-gross-square-foot basis. It also directed DOE to establish life-cycle costing methods and coordinate Federal conservation activities through the Interagency Energy Management Task Force. Section 152 of Subtitle F of EPACT, Federal Agency Energy Management, further amends NECPA and contains provisions regarding energy management requirements, life-cycle cost methods and procedures, budget treatment for energy conservation measures, incentives for Federal facility energy managers, reporting requirements, new technology demonstrations, and agency surveys of energy-saving potential.

Requirements of Executive Orders 12902 and 13123

During the majority of FY 1999, Executive Order 12902, Energy Efficiency and Water Conservation at Federal Facilities was in effect for Federal agencies. This Executive Order, signed by President Clinton on March 8, 1994, superseded Executive Order 12759 but left in effect sections 3, 9, and 10 of that Order. On June 3, 1999, President Clinton signed Executive Order 13123, Greening the Government Through Efficient Energy Management, superseding Executive Order 12902. This new Executive Order addresses greenhouse gas emissions from Federal facilities, as well as making energy-efficiency targets more stringent.

The key requirements of the legislation and Executive Order authorities are outlined in the exhibit below along with current findings.

KEY REQUIREMENTS OF LEGISLATIVE AND EXECUTIVE ORDER AUTHORITIES

Statute/Directive	Requirement	FY 1999 Findings	Annual Report Discussion
Section 543, NECPA, 42 U.S.C., § 8253(a)(1) Executive Order 13123 (increasing requirement from E.O. 12902)	20 percent reduction (Btu/GSF) in Federal buildings by 2000 from 1985. 30 percent reduction (Btu/GSF) by 2005 from 1985. 35 percent reduction by 2010 from 1985.	Federal agencies reported a 20.7 percent decrease in energy consumption in buildings in FY 1999, compared to FY 1985.	Section II (B), page 51
Section 545, NECPA, 42 U.S.C., § 8254	DOE to establish life-cycle cost methods to determine cost-effectiveness of proposed energy efficiency projects.	The 1999 edition of the energy price indices and discount factors for life-cycle cost analysis was published and distributed to Federal energy managers.	Section I (F), page 37
Section 545, NECPA, 42 U.S.C., § 8255	Transmit to Congress the amount of appropriations requested in each agency budget for electric and energy costs incurred in operating and maintaining facilities and for compliance with applicable statutes and directives.	Approximately \$204.2 million was appropriated and spent on energy efficiency projects in Federal facilities.	Section I (E), page 26
Section 546, NECPA, 42 U.S.C., § 8256(a)	Establishment of a program of incentives within Federal agencies to expedite Energy Savings Performance Contracts.	In FY 1999, 13 conventional ESPC contracts were awarded by agencies and 16 delivery orders were issued under DOE and DOD Super ESPCs.	Section I (E), page 32
Section 546, NECPA, 42 U.S.C., § 8256(b)	DOE to establish a Federal Energy Efficiency Fund to provide grants to agencies.	There were no appropriations for the Fund in FY 1999; FY 1995 funds were allocated and progress of the few remaining projects is being monitored.	Section I (E), page 30
Section 157, EPACT, 42 U.S.C., § 8262(c)	Federal agencies to establish and maintain programs to train energy managers and to increase the number of trained energy managers within each agency.	DOE's FEMP conducted 54 training workshops and symposia for more than 4,700 attendees in the efficient use and conservation of energy, water, and renewable energy in Federal facilities.	Section I (D), page 19; Section V, Agency Reports, page 75

Statute/Directive	Requirement	FY 1999 Findings	Annual Report Discussion
Executive Order 13123 (increasing requirement from E.O. 12902)	20 percent reduction for Federal industrial/laboratory facilities by 2005 from 1990. 25 percent reduction by 2010 from 1990.	Findings are specific to individual agencies.	Section III (B), page 64
Executive Order 13123	30 percent reduction in greenhouse gas emissions attributed to Federal facilities by 2010 from 1990.	Carbon emissions from energy used in standard and excluded/industrial buildings declined 15.7 percent in FY 1999 compared to FY 1990.	Section I(B), page 16
Executive Order 13123	Expand use of renewable energy by implementing renewable energy projects and by purchasing electricity from renewable sources. The Federal Government will strive to install 20,000 solar roofs by 2010.	Findings are specific to individual agencies. A Government-wide discussion will be included in the FY 2000 annual report.	Section V, Agency Reports, page 75
Executive Order 12902 Executive Order 13123	Minimize petroleum use within Federal facilities through use of non-petroleum energy sources and eliminating unnecessary fuel use.	The consumption of petroleum-based fuels in buildings during FY 1999 decreased 66.8 percent compared to FY 1985 and 6.7 percent from FY 1998.	Section II(A), page 47
Executive Order 13123	Reduce total energy use and greenhouse gas emissions, as measured at the source. Agencies shall undertake projects to reduce source energy, even if site energy use increases.	Primary energy consumed in buildings and facilities in FY 1999 decreased 16.7 percent from FY 1985 and 0.4 percent from FY 1998. Measured in terms of source energy, Federal buildings show a reduction of 7.8 percent in Btu/GSF during FY 1999 compared to FY 1985.	Section II(A), page 43, 46, and 52
Executive Order 13123	Reduce water consumption and associated energy use.	Findings are specific to individual agencies. A Government-wide discussion will be included in the FY 2000 annual report.	Section V, Agency Reports, page 75

B. Overall Federal Energy Consumption, Costs, and Carbon Emissions

As shown in Table 1-A, the total primary energy consumption of the Government of the United States, including energy consumed to produce, process, and transport energy, was 1.39 quadrillion British Thermal Units (quads) or 1,394,450.9 billion Btu during FY 1999. Primary energy consumption considers all resources used to generate and transport electricity and steam. (The source conversion factors of 10,346 Btu per kilowatt hour for electricity and 1,390 Btu per pound of steam are used to calculate primary energy consumption. See Appendix B for conversion factors used to calculate net energy consumption.) These 1.39 quads represent approximately 1.5 percent of the total 93.03 quads⁷ used in the United States, and reflect Government energy consumption in buildings and operations to provide essential services to its citizens, including the defense of the Nation. In total, the Federal Government is the single largest energy consumer in the Nation, although its pattern of consumption is widely dispersed.

Based on reports submitted to DOE by 29 Federal agencies, the Government consumed 1.01 quads during FY 1999 when measured in terms of energy actually delivered to the point of use (net consumption). As shown in Table 1-B, Federal agencies reported a 30.1 percent decrease in total net energy consumption compared to FY 1985, and a 2.4 percent decrease from FY 1998. The cost of this energy was \$8.0 billion and represented approximately 0.5 percent of the total Federal expenditures of \$1.727 trillion⁸ for all purposes in FY 1999. The Federal energy bill for FY 1999 fell 7.5 percent from the previous year, decreasing \$650.0 million in constant dollars compared to FY 1998.⁹

In FY 1999, the Department of Defense spent \$5.8 billion for energy of the total Federal energy expenditure of \$8.0 billion. Overall, the Department of Defense used 35.2 percent less net energy in FY 1999 than in FY 1985.

Figures 1 and 2 depict the percentage of total energy used by the Federal Government in FY 1999 and its cost. As illustrated, jet fuel and electricity account for approximately 62.1 percent of the total energy consumption represented in Figure 1 and approximately 74.0 percent of the total energy costs in Figure 2.

Petroleum-based fuels used by the Federal Government are shown in Table 2. In FY 1999, petroleum-based fuels accounted for 0.65 quads (650,664.6 billion Btu) of the total 1.01 quads consumed by the Federal Government. Of that, approximately 0.60 quads (595,418.4 billion Btu) were used by the Department of Defense primarily for jet fuel and distillate/diesel for vehicles and equipment energy. Only 0.04 quads (36,742.2 billion Btu) of petroleum-based fuels were used for Federal buildings and facilities energy.

⁷DOE/EIA-0035(2000/12), *Monthly Energy Review*, December 2000.

⁸*Analytical Perspectives, Budget of the United States Government, Fiscal Year 2000*

⁹Appendix C indicates the annual cost of energy used in Federal buildings and facilities, vehicles and equipment, and energy intensive operations for FY 1985 through FY 1999. The combined cost per Btu for energy in each fiscal year is also shown in the table.

TABLE 1-A
TOTAL PRIMARY ENERGY CONSUMPTION BY FEDERAL AGENCIES
(In Billions of Btu, with Conversions to Millions of Barrels of Oil Equivalent [MBOE], and Petajoules [Joule x 10¹⁵])

CIVILIAN AGENCY	FY 1985	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	%CHANGE 85-99	%CHANGE 98-99
USPS	47,439.3	54,767.8	56,017.0	57,697.8	61,629.9	63,646.5	65,828.1	67,412.9	71,636.0	71,861.1	72,898.5	53.7	1.4
DOE	88,660.3	82,447.3	79,395.5	82,543.2	79,546.4	78,656.3	81,131.1	80,797.6	69,893.3	64,093.9	63,910.5	-27.9	-0.3
VA	40,266.0	41,421.0	42,232.9	42,374.9	43,203.9	43,487.6	43,909.9	45,441.5	46,267.8	46,877.0	47,069.4	16.9	0.4
DOT	27,181.6	26,939.8	27,491.0	28,618.9	31,616.7	28,321.4	27,789.3	30,288.1	28,755.8	29,597.7	36,377.8	33.8	22.9
GSA	39,163.3	33,255.3	33,455.8	32,929.2	33,599.2	33,112.8	32,634.6	33,506.2	33,628.8	33,375.8	34,221.9	-12.6	2.5
NASA	21,465.6	25,779.9	26,607.0	26,874.9	26,695.9	27,242.2	26,419.2	24,457.1	25,821.7	25,055.8	24,459.8	13.9	-2.4
DOJ	10,595.9	10,790.3	13,230.3	12,139.6	13,964.4	15,664.1	15,959.9	19,309.5	18,857.8	23,353.4	23,274.6	119.7	-0.3
HHS	9,692.6	14,941.5	13,252.0	14,665.0	15,026.8	15,260.7	11,110.8	11,722.2	13,699.6	13,352.0	12,778.6	31.8	-4.3
USDA	11,576.9	13,655.1	13,830.4	13,287.1	13,650.6	13,721.9	14,072.5	13,348.3	11,534.8	12,212.2	11,764.7	1.6	-3.7
DOI	10,933.6	10,337.7	10,368.8	10,089.3	11,167.8	11,507.0	9,810.3	7,038.3	9,608.7	9,542.0	10,611.1	-3.0	11.2
TRSY	3,489.9	6,013.2	7,397.2	8,104.2	8,014.0	7,843.1	7,149.0	6,637.4	8,375.9	8,228.1	8,025.7	130.0	-2.5
ST ¹	6,224.6	6,358.0	6,347.8	747.0	1,060.4	1,137.8	1,184.7	1,686.9	7,486.3	7,455.3	7,114.7	14.3	-4.6
TVA ²	7,432.2	6,894.8	6,845.0	6,367.7	5,866.3	6,685.6	6,737.9	6,464.1	6,282.8	6,074.4	6,737.4	-9.3	10.9
DOC	3,804.6	6,046.9	4,261.0	4,083.2	4,287.4	5,007.0	5,173.4	4,930.3	4,866.3	4,558.3	4,777.1	25.6	4.8
DOL	3,688.0	3,842.5	3,923.8	3,944.2	4,050.7	4,119.3	3,992.2	4,094.5	4,123.2	4,168.6	3,337.1	-9.5	-19.9
EPA	1,621.0	1,483.2	1,635.5	1,662.7	1,845.1	1,922.7	2,062.6	2,010.2	2,050.8	2,021.4	2,250.6	38.8	11.3
HUD	315.2	384.2	407.0	378.7	346.0	324.0	310.6	326.8	318.0	303.2	310.2	-1.6	2.3
FCC	39.2	46.1	46.5	38.1	38.9	42.2	42.2	33.5	35.9	35.4	35.4	-9.6	0.0
OTHER*	898.6	3,784.3	2,825.3	2,885.8	3,210.1	4,051.6	6,207.3	8,491.6	9,229.4	8,819.1	8,569.1	853.6	-2.8
CIVILIAN AGENCIES TOTAL	335,606.4	350,508.0	350,844.3	350,810.1	360,203.0	363,147.8	363,124.1	369,588.0	374,013.1	370,984.7	378,524.1	12.8	2.0
DOD	1,457,548.3	1,491,843.4	1,511,223.6	1,346,120.3	1,288,504.3	1,211,887.4	1,150,296.9	1,120,399.0	1,090,079.5	1,043,465.2	1,015,926.8	-30.3	-2.6
ALL AGENCIES TOTAL	1,793,154.7	1,842,351.4	1,862,067.9	1,696,930.4	1,648,707.2	1,575,035.2	1,513,421.0	1,489,987.0	1,464,092.7	1,414,449.8	1,394,450.9	-22.2	-1.4
MBOE	307.8	316.3	319.7	291.3	283.0	270.4	259.8	255.8	251.3	242.8	239.4		
Petajoules	1,891.7	1,943.6	1,964.4	1,790.2	1,739.3	1,661.6	1,596.6	1,571.9	1,544.6	1,492.2	1,471.1		

DATA AS OF 10/26/00

*Other includes, for certain years, CFTC, CIA, EEOC, FEMA, FTC, NARA, NSF, NRC, OPM, RRB, SSA, USA, and FERC.

¹In 1998, the State Department developed a statistical method for estimating the energy consumption in the large number of foreign buildings it owns and leases. This method was subsequently applied to estimate FY 1991 energy consumption and is now used annually to assess progress. The FY 1991 foreign building estimates were combined with domestic building data for the fiscal years 1985 and 1990, since these are base years for performance goals.

²TVA's increase in energy consumption beginning in FY 1994 is the result of first-time reporting of energy consumed at generation sites.

Note: This table uses a conversion factor for electricity of 10,346 Btu per kilowatt hour and 1,390 Btu per pound of steam. Agencies are listed in descending order of consumption for the current year. Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

TABLE 1-B
TOTAL NET ENERGY CONSUMPTION BY FEDERAL AGENCIES
(In Billions of Btu, with Conversions to Millions of Barrels of Oil Equivalent [MBOE], and Petajoules [Joule x 10¹⁵])

CIVILIAN AGENCY	FY 1985	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	%CHANGE 85-99	%CHANGE 98-99
USPS	27,762.5	30,616.2	30,817.0	31,674.2	33,725.1	34,950.8	36,220.9	36,427.1	40,760.0	39,487.3	39,774.0	43.3	0.7
DOE	51,527.5	43,467.5	42,178.6	44,300.2	43,688.5	42,279.2	47,089.7	44,424.9	33,926.3	31,450.1	30,363.9	-41.1	-3.5
VA	25,144.7	24,898.4	25,050.4	25,254.9	25,741.2	25,587.8	25,428.9	26,832.9	27,261.1	27,597.2	27,472.4	9.3	-0.5
DOT	19,462.3	18,965.2	18,971.4	17,027.3	19,360.1	19,772.6	18,652.3	19,564.1	19,125.8	18,509.9	20,508.1	5.4	10.8
DOJ	8,176.0	6,961.6	8,018.3	7,544.3	9,081.7	10,263.6	10,193.3	12,127.7	11,999.9	15,805.1	15,366.2	87.9	-2.8
GSA	17,330.7	14,226.0	13,985.0	13,842.0	14,149.4	13,963.0	13,671.8	14,499.2	14,364.3	14,096.2	14,337.7	-17.3	1.7
NASA	10,827.9	12,321.8	12,455.4	12,538.8	12,358.7	12,588.3	12,395.3	11,480.6	11,980.3	11,717.1	11,419.1	5.5	-2.5
USDA	8,358.7	9,519.6	9,599.6	9,100.6	9,332.9	9,412.9	9,728.8	9,056.9	7,370.7	7,917.0	7,828.6	-6.3	-1.1
DOI	7,816.3	7,391.9	7,094.8	6,992.4	7,482.1	7,892.2	6,378.4	4,326.6	6,612.2	6,427.3	7,456.0	-4.6	16.0
HHS	5,953.5	7,957.0	7,107.1	7,954.7	8,146.3	8,408.3	6,129.7	6,628.9	7,852.8	7,400.8	7,036.3	18.2	-4.9
TRSY	2,770.0	3,391.6	4,177.1	4,628.4	4,912.7	4,558.2	4,132.6	3,764.1	4,597.6	4,816.3	4,598.4	66.0	-4.5
ST ¹	2,771.7	2,827.4	2,799.0	273.8	390.2	422.3	437.3	653.3	3,278.0	3,258.4	3,368.6	21.5	3.4
DOC	2,489.1	4,476.3	2,722.2	2,460.1	2,338.4	2,858.3	2,882.8	2,883.1	2,721.4	2,470.3	2,684.3	7.8	8.7
TVA ²	2,851.9	2,605.4	2,623.2	2,380.9	2,246.2	2,534.9	2,607.3	2,547.8	2,396.9	2,295.9	2,510.1	-12.0	9.3
DOL	2,385.2	2,376.0	2,446.0	2,452.4	2,514.9	2,527.9	2,385.7	2,491.5	2,490.2	2,540.4	2,048.1	-14.1	-19.4
EPA	904.5	747.0	822.4	839.7	994.8	1,041.2	1,120.6	1,099.7	1,148.3	1,120.6	1,290.6	42.7	15.2
HUD	116.9	140.3	164.9	156.7	147.8	144.2	131.3	140.8	137.6	126.4	129.6	10.8	2.5
FCC	23.6	23.9	22.1	19.9	20.2	20.7	20.7	17.5	19.9	19.4	19.4	-17.9	0.0
OTHER*	408.2	2,175.0	1,382.0	1,460.4	1,604.1	1,981.0	2,979.7	3,716.2	3,998.7	3,870.0	3,835.5	839.5	-0.9
CIVILIAN AGENCIES TOTAL	197,805.6	195,961.3	193,244.4	191,825.1	199,150.2	202,128.4	203,695.1	203,763.8	203,063.9	200,925.6	202,047.1	2.1	0.6
DOD	1,250,613.8	1,241,655.8	1,269,291.5	1,103,990.1	1,048,772.9	977,040.4	926,022.9	904,150.2	880,007.7	837,115.8	810,663.0	-35.2	-3.2
ALL AGENCIES TOTAL	1,448,419.4	1,437,617.1	1,462,535.9	1,295,815.2	1,247,923.1	1,179,168.8	1,129,718.0	1,107,914.0	1,083,071.6	1,038,041.4	1,012,710.1	-30.1	-2.4
MBOE	248.7	246.8	251.1	222.5	214.2	202.4	193.9	190.2	185.9	178.2	173.9		
Petajoules	1,528.0	1,516.6	1,542.9	1,367.0	1,316.5	1,244.0	1,191.8	1,168.8	1,142.6	1,095.1	1,068.4		

DATA AS OF 10/26/00

*Other includes, for certain years, CFTC, CIA, EEOC, FEMA, FTC, NARA, NSF, NRC, OPM, RRB, SSA, USA, and FERC.

¹In 1998, the State Department developed a statistical method for estimating the energy consumption in the large number of foreign buildings it owns and leases. This method was subsequently applied to estimate FY 1991 energy consumption and is now used annually to assess progress. The FY 1991 foreign building estimates were combined with domestic building data for the fiscal years 1985 and 1990, since these are base years for performance goals.

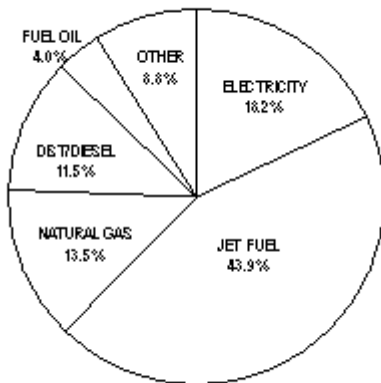
²TVA's increase in energy consumption beginning in FY 1994 is the result of first-time reporting of energy consumed at generation sites.

Note: This table uses a conversion factor for electricity of 3,412 Btu per kilowatt hour and 1,000 Btu per pound of steam. Agencies are listed in descending order of consumption for the current year. Sum of components may not equal total due to independent rounding.

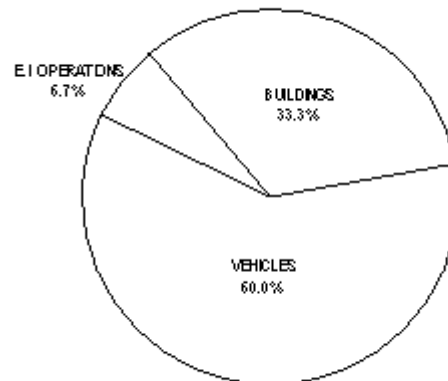
Source: Federal Agency Annual Energy Management Data Reports

FIGURE 1
Federal Energy Consumption, FY 1999

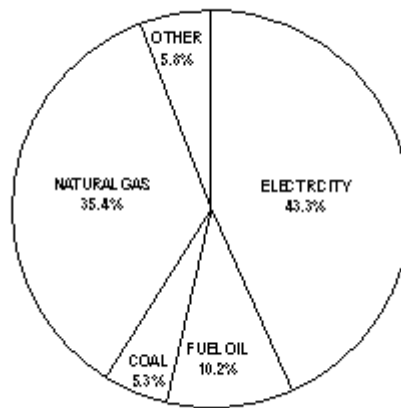
Total by Energy Type: 1.01 quads



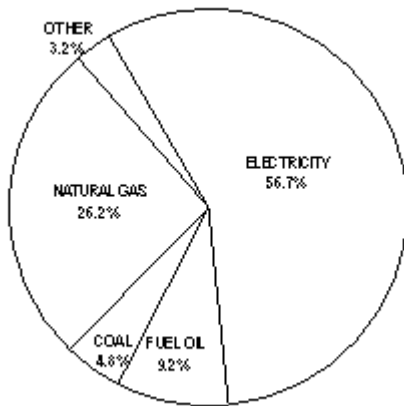
Total by Sector: 1.01 quads



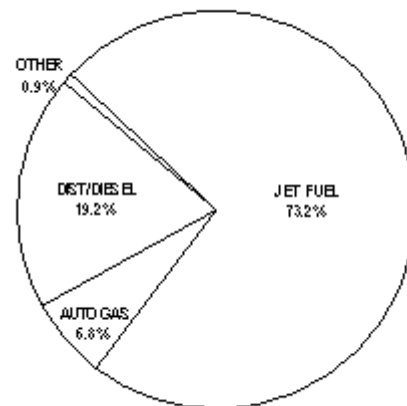
Buildings & Facilities: 0.34 quads



Energy Intensive Operations: 0.07 quads



Vehicles & Equipment: 0.61 quads



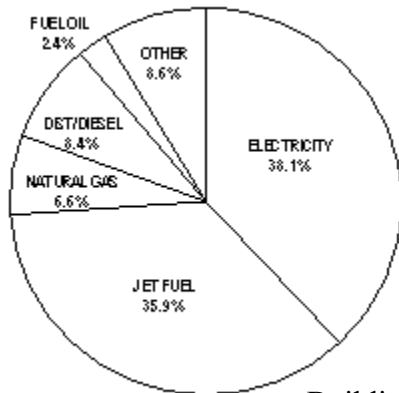
Data as of 10/26/00

Source: Federal Agency Annual Energy Management Data Reports

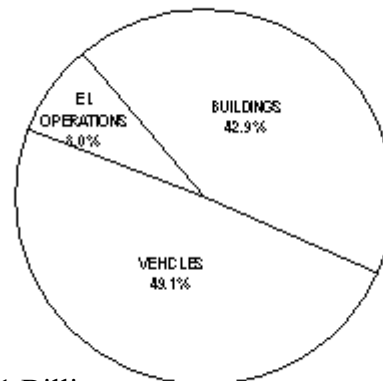
Note: Sum of components may not equal 100 percent due to independent rounding.

FIGURE 2
Federal Energy Costs, FY 1999

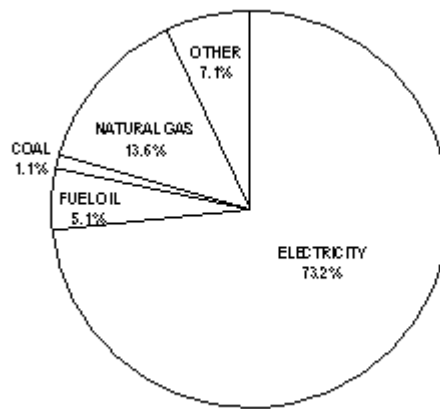
Total by Energy Type: \$7.96 Billion



Total by Sector: \$7.96 Billion

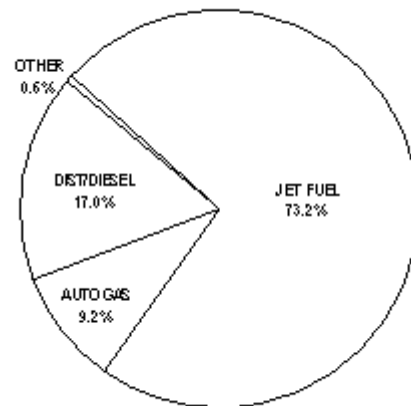
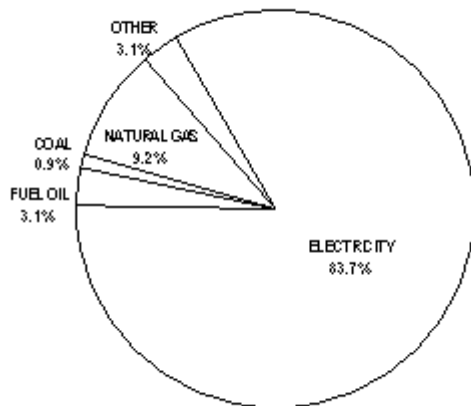


Buildings & Facilities: \$3.41 Billion



Energy Intensive Operations

ent: \$3.91 Billion



Data as of 10/26/00

Source: Federal Agency Annual Energy Management Data Reports

Note: Sum of components may not equal 100 percent due to independent rounding.

TABLE 2
FEDERAL PETROLEUM USAGE IN FY 1999
(in Thousands of Gallons, Billions of Btu,
and Petajoules [Joule x 10¹⁵])

	Unit Total (KGal)	BBTU* DOD	BBTU* Civilian	BBTU* Total	Petajoules* Total
Buildings & Facilities					
Fuel Oil	248,903.9	28,980.7	5,542.2	34,523.0	36.42
LPG/Propane	23,238.4	1,525.9	693.3	2,219.3	2.34
Energy Intensive Operations					
Fuel Oil	45,289.9	5,029.8	1,251.9	6,281.7	6.63
LPG/Propane	1,418.3	96.1	39.4	135.4	0.14
Vehicles & Equipment					
Motor Gas	328,523.9	13,495.7	27,569.8	41,065.5	43.32
Dist-Diesel & Petrol.	840,483.2	104,889.2	11,685.8	116,575.0	123.01
Aviation Gas	1,067.0	0.3	133.1	133.4	0.14
Jet Fuel	3,420,616.0	436,761.0	7,919.0	444,680.1	469.12
Navy Special	32,760.9	4,543.8	0.1	4,543.9	4.79
LPG/Propane	829.0	69.0	10.2	79.2	0.08
Other	428.1	26.8	401.3	428.1	0.45
Total		595,418.4	55,246.2	650,664.6	686.40

DATA AS OF 10/26/00

*Uses a conversion factor of:

95,500 Btu/gallon for LPG/propane

138,700 Btu/gallon for fuel oil, distillate-diesel & petroleum, and navy special

125,000 Btu/gallon for motor gasoline and aviation gasoline

130,000 Btu/gallon for jet fuel

947.9 Billion Btu/Petajoule

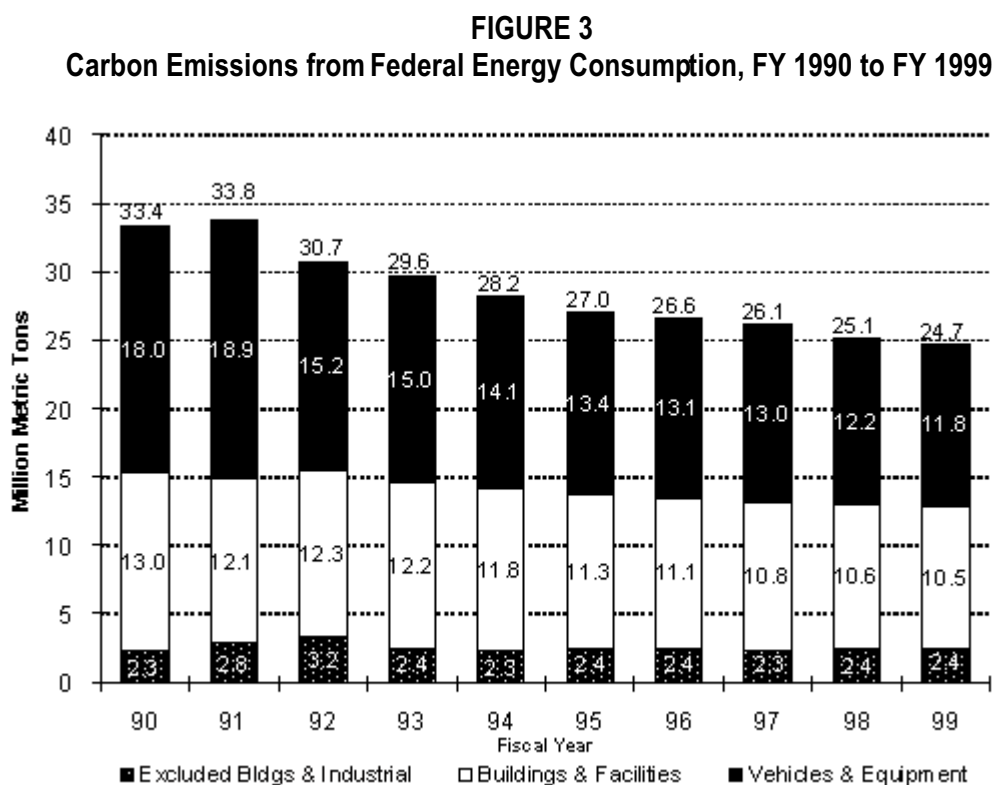
Note: FY 1999 contains estimated data for the following agencies: FEMA, FTC, and OPM.
Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

Carbon emissions from Federal Government energy consumption have decreased significantly since FY 1990, the base year for the Kyoto Protocol to the United Nations Framework on Climate Change. As shown in Figure 3, the Federal Government has reduced carbon emissions across the three end-use sectors by 26.0 percent from 33.4 million metric tons in FY 1990 to 24.7 million metric tons in FY 1999.¹⁰ The largest contribution to this reduction is from the vehicles and equipment sector, which has seen a decrease in carbon emissions of 34.4 percent. This is a result of a reduction of almost 5.6 million metric tons of carbon emissions from jet fuel, as well as smaller reductions from diesel, aviation gasoline, navy special, and LPG/propane.

Carbon emissions have decreased by 19.5 percent in the buildings and facilities sector since 1990. Contributing to this reduction was a 10.1 percent reduction in gross square footage since FY 1990 and a 8.2 percent decrease in primary energy intensity (245,730 Btu/GSF in FY 1990, 225,543 Btu/GSF in FY 1999). Carbon emissions from energy intensive activities in excluded buildings increased 4.6 percent (0.1 million metric tons) since FY 1990.

Section 201 of Executive Order 13123 establishes a goal for each agency to reduce greenhouse gas emissions attributed to facility energy use by 30 percent by 2010 compared to such emissions levels in 1990. When the carbon emissions from energy used in the buildings and facilities and the excluded buildings and industrial sectors are combined, a reduction of 15.7 percent is exhibited in FY 1999 compared to FY 1990.



¹⁰Carbon emissions were calculated by multiplying energy consumption for each fuel type by an associated carbon coefficient shown in Appendix B. These coefficients are derived from DOE/EIA-0573(98), *Emissions of Greenhouse Gases in the United States, 1998*, October 1999; Tables 11 and B1.

C. Federal Coordination

Federal Interagency Energy Policy Committee (“656” Committee)

The Federal Interagency Energy Policy Committee (“656” Committee) was established in accordance with Section 656 of the Department of Energy Organization Act (P.L. 95-91) to strengthen Government programs that emphasize productivity through the efficient use of energy, and concurrently, to encourage interagency cooperation in energy conservation. There were no meetings of the 656 Committee held in FY 1999. At the Committee’s January 24, 2000 meeting, the following items were discussed:

- The U.S. Army’s initiative to utilize wind power at Fort Bliss in Texas.
- Executive Order 13123 requirements pertaining to sustainable design principles to be applied by agencies when siting, designing, and constructing new facilities.
- The General Services Administration’s activities (required under Executive Order 13123) in developing model lease provisions for ensuring energy efficiency in space leased by the Federal Government.
- The Environmental Protection Agency’s efforts in green power purchasing, including the purchase of 100 percent green power for its laboratory in Richmond, California.
- The Green Energy Parks Initiative partnership between DOE and the Interior Department, which will present the 250 National Parks and wildlife reserves as models of efficiency and environmental preservation.
- FEMP’s efforts to develop a comprehensive interagency agreement that can be used to access any of FEMP’s services, including ESPC and utility financing support, energy audits, and design assistance.

Federal Interagency Energy Management Task Force

The Federal Interagency Energy Management Task Force (Task Force) was established in accordance with the Federal Energy Management Improvement Act of 1988 to stimulate increased energy efficiency in the Federal sector. The Task Force serves as technical advisor to the Federal Interagency Energy Policy Committee (656 Committee) by coordinating the activities of the Federal Government in promoting energy conservation and the efficient use of energy.

The Director of FEMP serves as the Executive Director of the Task Force. The Task Force, composed of the chief energy managers of the agencies represented on the 656 Committee, addresses energy issues affecting Federal facilities and operations and provides the 656 Committee with in-depth analysis and recommendations concerning current and pending legislation, technical issues, and implementation of coordinated Federal activities.

The Task Force assesses the progress of agencies toward achieving energy savings, and collects and disseminates information on effective survey techniques, technologies that promote

conservation and efficient use of energy, and innovative programs and contracting methods. To accomplish its mission, the Task Force establishes working groups to resolve specific technical or programmatic issues, to develop new initiatives for Federal implementation, and to address legislative requirements and topics presented by the 656 Committee, the Executive Director, or member agencies.

Over the last year, the Task Force met six times: January 21, 1999; May 20, 1999; July 14, 1999; September 15, 1999; November 10, 1999; and January 12, 2000. Issues highlighted in the these meetings included the following:

- The Federal Commercial Building Energy Standard (FEDCOM).
- A draft Combined Heat and Power Plan developed by FEMP.
- *You Have the Power* energy awareness campaign.
- Energy efficiency opportunities at buildings that agencies have designated exempt from energy reduction goals.
- Utility metering and billing issues and how they affect Federal agencies.
- Executive Order 13123, Greening the Government through Efficient Energy Management, including numerous reports from Task Force working groups implementing provisions of the Order.
- Aggregation of agency electricity purchases and green power issues.
- Federal participation in DOE's Wind Powering America program.

On June 3, 1999, President Clinton signed Executive Order 13123, *Greening the Government Through Efficient Energy Management*. FEMP has been charged with a myriad of support and analysis tasks that will help operationalize the Executive Order and achieve its goals. To this end, 10 working groups were established under the Task Force. These cover:

- Energy Efficient Product Procurement;
- Energy Intensive Facilities;
- Leasing;
- New Space;
- Project Financing;
- Renewable Energy;
- Reporting;
- Technical Tools/Training;
- Utility Markets; and
- Water Conservation

Most of the activity so far has been concentrated in the Energy Intensive Facilities, Project Financing, Reporting, Renewable, Utility Markets, and Water Conservation working groups. Each of these groups has either produced guidance, or is currently working on guidance, that will enable Federal agencies to correctly interpret and implement the Executive Order. Documents and guidance materials produced by the various working groups must be approved by the Interagency Energy Management Task Force.

D. Personnel and Energy Awareness Activities

During FY 1999, DOE's Federal Energy Management Program (FEMP) conducted 54 training workshops and symposia for more than 4,700 attendees in the efficient use and conservation of energy, water, and renewable energy in Federal facilities.

FEMP supplemented its classroom workshops with "distance learning" training, via satellite. The Energy Management Teleworkshop, a 10-module survey of FEMP courses, attracted 1,235 viewers; the Utility Financing and the Utility Deregulation Impacts teleworkshops attracted 170 students each.

Nine workshops on energy savings performance contracting (ESPC) were conducted in FY 1999 for 242 participants. In each workshop, facility managers, contract specialists, and building engineers were instructed on the statutory provisions for this innovative contracting/financial method, and how to identify suitable projects. ESPC allows energy-efficient improvements to be installed by private contractors with no up-front capital costs.

The Designing Low Energy Buildings course was presented twice for 28 participants. The two-day course included analyses and case studies of building design using passive solar heating, natural ventilation and cooling, and day lighting, as well as glazing and overhangs. The satellite presentation of the course attracted 633 viewers.

The FEMP Lights course was conducted twice for a total of 46 participants. The objective was to provide guidance on energy-efficient lighting consistent with other facility lighting considerations, quality and cost, and whole building analysis. Topics included: basic lighting concepts; a comprehensive process for Federal relighting project development and implementation; and the use of professional lighting design services.

Two Facility Energy Decision Screening (FEDS) workshops were held during FY 1999 for 15 attendees. This is a training course for Federal facility managers on whole-site analysis of energy conservation, technical, and financial opportunities utilizing the FEDS-Level 1 project screening software and the FEDS-Level 2 project implementation software.

The Operations and Maintenance Management classroom course was presented once for 7 students; the satellite version was presented once for 250 students.

FEMP, in conjunction with the National Institute of Standards and Technology, conducted four workshops on life-cycle costing and building retrofit simulation for 81 students. The Buying Energy-Efficient Products course was presented twice for 39 students.

The Implementing Renewable Energy Projects course was presented twice for 44 students, and the Laboratories for the 21st Century course attracted 189 students.

FEMP continued to offer its Water Resource Management course with one workshop for 12 attendees in FY 1999. The course is designed to assist Federal site managers and agencies in meeting the water conservation requirements of Energy Policy Act of 1992 (EPACT) and Executive Order 12902.

During FY 1999, FEMP participated in the organization and presentation of 23 panel discussions on Federal energy efficiency, water conservation, and renewable energy topics at national energy management conferences around the country, attracting 1,602 attendees.

The Federal Energy Management Program continued to offer its Training Course Locator System to assist Federal agencies in training energy managers and in meeting the requirements of the EPACT. The Locator System connects those seeking particular training courses with the sponsoring organization for those courses by responding to numerous requests from Federal energy managers, utility managers, engineers, building operators, and facility personnel.

Recognition

Outstanding accomplishments in energy efficiency and water conservation in the Federal sector were recognized with the presentation of the 1999 Federal Energy and Water Management Awards on October 28, 1999 in Washington, D.C. The Awards Program is sponsored by the 656 Committee and the Department of Energy. Awards were selected from outstanding Federal energy managers and contributors who:

- Implemented proven energy efficiency, energy and water conservation techniques;
- Developed and implemented energy-related training programs and employee energy awareness programs;
- Succeeded in receiving utility incentives, or awarding ESPC and other Federal-approved performance-based energy and water contracts;
- Made successful efforts to fulfill compliance with energy and water reduction mandates;
- Improved energy efficiency or reduction in energy costs for Federal mobile equipment including aircrafts, ships, and vehicles;
- Improved tracking of energy consumption, costs and energy efficient investments;
- Provided leadership in purchasing or supplying energy-efficient, renewable energy or water-conserving products to one or more Federal agencies; and
- Demonstrated cost-beneficial landscape practices which utilize techniques that seek to minimize the adverse effects of landscaping.

Recipients of the 1999 awards were selected from 180 nominees submitted by 21 Federal agencies. Award recipients totaled 51, representing 19 different Federal agencies. Distribution of awards among the Federal agencies for accomplishments in FY 1998 is indicated below. Awards were presented to agencies in the categories shown in the exhibit below:

Agency	Individual	Small Group	Organization	Total	Energy Efficiency	Alternative Financing	Renewable Energy	Mobility	Water Mgmt.	Exceptional Service
Army	3	2	1	6	4	1				1
Navy	1		2	3			1	1		1
USAF	1	1	2	4	2	1	1		1	
USMC		1		1	1					
DOE	1	1	1	3		1			1	1
Interior	1	1	1	3			2			1
DOJ	1			1	1					
State	1	1	1	3		1	1			1
DOT	2	1		3	1	1				1
EPA			1	1		1				
GSA	2	5	2	9	5	2			1	1
HHS		1		1						1
NASA		2		2				1	1	
NIMA	1			1						1
SSA	1			1	1					
Treasury			1	1						1
Agriculture			1	1					1	
USPS	1	2	1	4	2	1				1
VA	2		1	3	1	2				
TOTAL	18	18	15	51	18	11	5	2	5	11

Each category contained a wide variety of projects. Examples from each award category follow.

Energy Efficiency Award to Organization:

United States Army Tank Automotive Center, Armament Research Center, United States Army Picatinny Arsenal, New Jersey. The United States Army Tank-Automotive Armaments Command, Armament Research, Development and Engineering Center (TACOM-ARDEC) has exceeded the FY 1998 Army energy goal by 13 percent compared with FY 1997. Dual fuel capability for heating contributed to savings of almost \$314,000 in FY 1998 and cumulative savings of \$5.6 million since the program's inception in FY 1991. TACOM-ARDEC participated in a fuel cell project that involved the conversion of all boilers in the powerhouse to dual fuel capacity and completed a lighting retrofit in FY 1998 for 128 buildings. Estimated savings from these projects are 2,600 kilowatts, 8.2 million Btu, and yearly budget savings of \$243,000.

Energy Efficiency Award to Small Group:

Larry Emmons, Carl C. Fillingame, Stuart Hammons, Mark L. Haskett, Douglas Sanford. United States Marine Corps, Barstow, California. The team of professionals at Marine Corps Logistics Base (MCLB) Barstow avoided costs of \$2.7 million in FY 1998. To achieve this, the team installed T-8 32-watt fluorescent lighting systems with electronic ballasts, energy-efficient motors, satellite boilers, and an energy monitoring and control system through a demand side management (DSM) project with ENVEST, a division of Southern California Edison. The group renegotiated the \$4.2 million contract and reduced the interest from 14 percent to 9 percent, avoiding \$1.5 million in interest costs. Additionally, they used the Base newspaper, local newspapers and radio stations, billboards, announcements, memos, and the Internet to get the energy efficiency message out to Base personnel. The MCLB Barstow team has proven its

adeptness both at installing and demonstrating advanced technologies and using DSM third party financing and energy award funds to finance energy products. In FY 1998, MCLB Barstow saved a total of 95 billion Btu and more than \$1.2 million.

Energy Efficiency Award to Individual:

Ron Jakaitis, General Services Administration, Denver, Colorado. In a cooperative agreement with Public Service Company of Colorado (PSCO), Mr. Jakaitis made the new Dave Skaggs Research Center the first building in the General Services Administration's (GSA) Rocky Mountain Region to comply and exceed the requirements listed under the Department of Energy's Federal Energy Efficiency Requirements of Part 435, Title 10-Energy. GSA entered into agreements with PSCO to obtain energy efficiency upgrades in less than five years. The upgrades will result in estimated annual savings of \$130,000. Upgrades include the installation of occupancy sensors and dimming controls for lighting, premium efficiency motors for HVAC equipment, and a flat heat exchanger. Under the agreement, PSCO provided financing and technical expertise to assist Mr. Jakaitis in ensuring that compliance was met all the way through construction. Mr. Jakaitis also educated others by speaking at utility conferences about the unique energy and resource efficiency features of the Dave Skaggs Research Center.

Energy Savings Performance Contracting Award:

Fermilab, Department of Energy, Batavia, Illinois. The Fermilab Central Cooling Retrofit project replaced worn and inefficient CFC chillers and pumping systems installed in the 1960s. A utility service agreement was procured through the local Department of Energy (DOE) office and was competed between both the local gas utility company and the local electric company to maximize cost competitiveness. The \$3.55 million award was won by Commonwealth Edison, the local electric company. The project was completed in May 1999. Due to the success of the project, the last of the old Class 1 CFC chillers has been eliminated, making Fermilab one of the first DOE facilities to become fully compliant with the requirements of the Secretary of Energy to eliminate such units whenever possible. Discounted savings over the 25-year life of the project are projected at \$12.3 million based upon annual energy savings of 68.2 billion Btu.

Renewable Energy Award:

Joshua Tree National Park, Department of the Interior, Twentynine Palms, California. President Franklin D. Roosevelt established the Joshua Tree National Park in 1936 to protect significant examples of the Mojave and Colorado Desert ecosystems. Until 1998, diesel-powered generators were the primary source of power to sustain operations at the remote Cottonwood visitor use area and employee housing facility located in the southeast portion of the Park. In 1998, the Park replaced two 32-kilowatt diesel generators with a 21-kilowatt photovoltaic power array system and a 30-kilowatt propane backup generator that now totally support the electrical power needs of the Cottonwood area. The diesel system produced 5,770 pounds of nitrous oxide, 120 tons of carbon dioxide, and 218 pounds of suspended particulates. Total annual operating costs were estimated to be \$49,770. Annual operating costs have been lowered by 90 percent and pollution emissions have been all but eliminated.

Mobility Energy Management Award:

Timothy A. Debth, Keith Gunsch, Leland Leard, Leslie A. Main, John H. Glenn Research Center at Lewis Field, National Aeronautics and Space Administration, Cleveland, Ohio. Since the

issuance of the Alternative Motor Fuels Act of 1988 and Executive Order 12759, it was decided that natural gas would be the alternative fuel used at NASA's John H. Glenn Research Center (GRC), Cleveland, Ohio. It wasn't until FY 1997 that GRC reached an agreement with East Ohio Gas that enabled the Center to construct a twin-hose, fast-fill compressed natural gas refueling station on site. Construction was completed in September 1998. The twin hose dispenser can fuel two vehicles simultaneously in about the same time it takes to fill a single vehicle with gasoline. With 12 natural gas vehicles on-site, an annual dependence on 8,000 gallons of gasoline has been avoided annually.

Water Management Award:

36th Civil Engineer Squadron, Andersen Air Force Base, United States Air Force, Guam. The 36th Civil Engineer Squadron's Operations Flight at Andersen Air Force Base, Guam, achieved remarkable results in water conservation initiatives in FY 1998. Compared to FY 1997, more than 140 million gallons of water were saved as a result of aggressive maintenance and repair of the Base's water distribution system and implementation of water conservation measures. Andersen Air Force Base is one of the few U.S. Air Force bases that produce its own water. Given the unique challenge of living in an island environment subject to drought conditions and significant shifts in the climate, water is a most precious resource. Water main breaks and leaky valves are just two examples of problems with the water distribution system that resulted in the Base having to produce over 1.1 billion gallons of water in FY 1997. To address these problems, members of the 36th Civil Engineer Squadron Operations Flight identified and repaired leaks and replaced valves throughout the Base. Because of these aggressive repair efforts, monthly water production rates decreased 35 percent by the end of FY 1998, and sustained results in FY 1999 are expected to yield additional savings of 300 million gallons from the FY 1998 baseline. Actual savings in water production, energy, and sewage treatment costs exceeded \$490,000 in FY 1998, while projected cost savings in FY 1999 are \$789,000.

Exceptional Service Award:

United States Mint, Department of Treasury, Washington, DC. The United States Mint Energy Performance Team has taken sustained and aggressive action to reduce energy costs and consumption at its facility in Philadelphia, Pennsylvania. The team installed electric chillers at the site, then negotiated rate reduction incentives with Philadelphia Electric Power Company that will earn the Mint \$200,000 in savings over the next 10 years. Next, the team renegotiated the non-fuel portion of its steam rate with TRIGEN, another local utility, eventually achieving a 20 percent reduction in nonfuel rate charges. As a result, the Mint avoided \$87,200 in costs during 1997 and \$82,500 in 1998. As a part of the renegotiated contract, the team also persuaded TRIGEN to provide the Philadelphia Mint a back pressure steam turbine generator at no cost. Another project involved replacing the Mint's existing main electrical transformer with a larger unit. By replacing the existing transformer, the Mint was able to change from secondary service rates to primary services rates that will save \$35,000 per year in electrical costs. During 1998, the team's initiatives produced almost \$400,000 in savings and cost avoidance, reduced energy usage by 9.7 trillion Btu, and conserved more than 2.1 million gallons of water. Moreover, the Mint achieved these savings and efficiencies on the eve of minting two of the largest and longest-running coin programs in U.S. history – the introduction of a new dollar coin and 50 State commemorative quarters, five new quarters each year for a decade.

Energy Awareness

The Federal Government, as the largest single employer in the United States, has the responsibility to set an example for the nation by conducting energy awareness programs. Most agencies have ridesharing, carpooling, and/or public transportation programs in effect. Many agencies also participate in recycling programs. The following exhibit shows the employee awareness activities at the various Federal agencies.

Agency	Award Programs	Recycling	Ridesharing	Transit Subsidies	Information Dissemination
USDA	✓	✓	✓		✓
DOC	✓	✓	✓		
DOD	✓	✓	✓	✓	✓
DOE	✓	✓	✓	✓	✓
HHS	✓	✓	✓	✓	✓
HUD	✓	✓	✓	✓	
DOI	✓	✓	✓	✓	✓
DOJ	✓	✓	✓		✓
DOL	✓	✓	✓	✓	✓
ST		✓	✓		
DOT	✓	✓	✓	✓	✓
TRSY		✓	✓	✓	✓
VA		✓			
EPA	✓	✓	✓	✓	✓
GSA	✓	✓	✓		
NASA	✓	✓	✓	✓	✓
NARA	✓				
NRC		✓	✓	✓	✓
RRB		✓		✓	
SSA	✓	✓			
TVA		✓	✓		✓
USPS	✓	✓	✓	✓	✓

Federal Energy Saver Showcase Facilities

Nine facilities in five different Federal agencies have been designated Federal Energy Saver Showcases for 1999 for incorporating cost-effective energy efficiency, water conservation, and renewable energy technologies. The agencies and showcase facilities are as follows:

General Services Administration

- Denver Federal Courthouse, Colorado
- Seattle Federal Courthouse, Washington

Department of Commerce: National Oceanic and Atmospheric Administration

- Hawaiian Islands Humpback Whale National Marine Sanctuary, Hawaii

Department of Health and Human Services: National Institutes of Health

- Building 50, Consolidated Laboratory Facility, The Louis Stokes Laboratories, Maryland

Department of the Interior: National Park Service

- Cottonwood Visitor Use Complex, Joshua Tree National Park, California
- North Manitou Island, Sleeping Bear Dunes National Lakeshore, Michigan
- Visitor Center, Whitman Mission National Historic Site, Washington
- Zion Canyon Visitor Center, Zion National Park, Utah

Department of Transportation: Federal Aviation Administration

- West Palm Beach Air Traffic Control Tower, Florida

Executive Order 13123, Greening the Government Through Efficient Energy Management, states that agencies shall designate “exemplary new and existing facilities with significant public access and exposure as showcase facilities to highlight energy or water efficiency and renewable energy improvements.”

The nine facilities designated Federal Energy Saver Showcases for FY 1999 are expected to save the Government more than \$1.4 million in energy costs each year. These showcases represent some of the best applications of energy efficiency and renewable energy in the Federal sector, and each helps the Government run more efficiently.

E. Funding for Energy Efficiency in Buildings and Facilities

During FY 1999, Federal agencies had three primary options for financing energy efficiency, water conservation, and renewable energy projects in buildings and facilities: direct appropriated funding, energy savings performance contracts (ESPCs), and utility-sponsored demand side management (DSM) incentives. The latter two options utilize non-Government sources of funding and can be used to supplement Government funding. Each of these three sources can be combined with another. Formerly, the DOE's Federal Energy Efficiency Fund grant program was a fourth option available to agencies for funding projects; however, there were no appropriations for the Fund in FY 1999.

To the extent that agencies have been able to provide complete reporting, funding from the three sources totaled approximately \$338 million in FY 1999.

Direct Appropriations

The National Energy Conservation Policy Act requires each agency, in support of the President's annual budget request to Congress, to specifically set forth and identify funds requested for energy conservation measures. Table 3-A presents agency funding (in nominal dollars) reported from FY 1985 through FY 1999 for energy conservation retrofits and capital equipment. Table 3-B presents the same information in constant 1999 dollars. In constant dollars, funding for energy conservation declined from \$399.6 million in FY 1985 to a low of \$65.1 million in FY 1989. Reports from Federal agencies indicated that \$205.2 million was spent on retrofit expenditures in FY 1999, compared with \$264.7 million in FY 1998. In some cases, the data provided by the agencies include funding from operation and maintenance accounts that was specifically identified as contributing to energy efficiency. Figure 4 illustrates agency spending trends for the five largest energy-consuming agencies and the remaining group of Federal agencies.

The Defense Department funded \$91.2 million in expenditures for energy efficiency projects in FY 1999, \$102.7 million less than the previous year.

No direct funding was appropriated for the Department of Energy in FY 1999 for retrofit projects in buildings and metered process facilities.

Table 3-A
Agency Expenditures for Energy Conservation Retrofits and Capital Equipment,
FY 1985 through FY 1999 (Thousands of Nominal Dollars)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Projected 2000
DOC	0	0	0	0	0	0	0	872	0	51	0	0	NA	330	N/A	N/A
DOD	136,100	120,000	5,550	5,280	1,500	1,020	10,000	49,669	14,444	109,000	189,600	112,487	118,970	191,446	91,243	54,831
DOE	14,800	14,500	16,500	18,900	19,400	19,500	20,400	20,650	20,950	24,850	30,200	0	0	0	0	0
DOI	3,198	5,535	0	0	4,338	0	1,272	9,800	4,859	1,662	779	891	0	160	1,730	868
DOJ	0	0	0	195	484	6,100	26,400	0	N/A	1,284	994	1,559	2,091	1,500	1,615	1,500
DOL	238	31	106	142	584	17	35	16	0	0	N/A	366	0	0	40	200
DOT	13,650	15,000	12,104	12,700	2,908	0	460	143	593	5,970	3,793	2,585	3,176	3,000	9,005	9,800
EPA	0	0	0	0	0	0	0	0	500	0	1,720	1,600	1,600	0	0	0
GSA	6,700	6,100	2,900	9,400	4,868	11,125	30,123	37,000	30,000	37,000	7,242	7,400	20,000	0	25,000	N/A
HHS	0	0	0	427	427	427	427	0	1,813	1,915	1,271	2,676	2,879	2,200	4,793	7,803
HUD	0	0	0	0	0	0	0	0	43	30	43	0	2,418	0	0	0
NASA	11,800	12,100	1,700	1,400	4,499	2,943	7,556	7,086	25,072	24,658	20,666	30,266	15,919	13,813	18,509	20,162
PCC	1,274	73	1,174	600	378	361	807	249	500	608	14	23	3	104	N/A	N/A
RRB	0	0	0	0	0	0	0	0	16	13	33	0	38	23	0	0
STATE	0	0	0	0	0	0	0	0	0	67	0	0	1,902	51	1,238	N/A
TRSY	0	0	2,977	2,393	2,823	1,134	836	0	1,344	4,826	2,810	170	2,990	1,400	1,495	1,000
TVA	0	0	0	0	0	0	0	0	475	844	4,277	522	1,158	1,466	1,022	750
USDA	2,500	0	0	500	500	1,547	1,752	7,300	7,045	7,277	2,894	5,983	3,891	1,765	994	N/A
USPS	55,300	9,300	5,100	3,800	4,000	4,000	4,000	2,293	1,116	1,123	10,050	9,000	16,000	31,000	38,000	15,000
VA	13,000	11,500	9,500	9,860	5,500	11,200	9,970	10,000	12,100	9,050	11,960	3,700	7,400	13,000	10,500	10,500
Total	258,560	194,139	57,611	65,597	52,209	59,374	114,038	145,078	120,870	230,228	288,346	179,228	200,435	261,258	205,184	122,414

Notes: **Bold** indicates top five energy users in buildings and facilities (DOD, DOE, VA, USPS, GSA). In past years, DOE also included funds for energy surveys. Does not include energy savings performance contracts and utility demand side management incentives.

Source: Federal Agency Annual Energy Management Data Reports

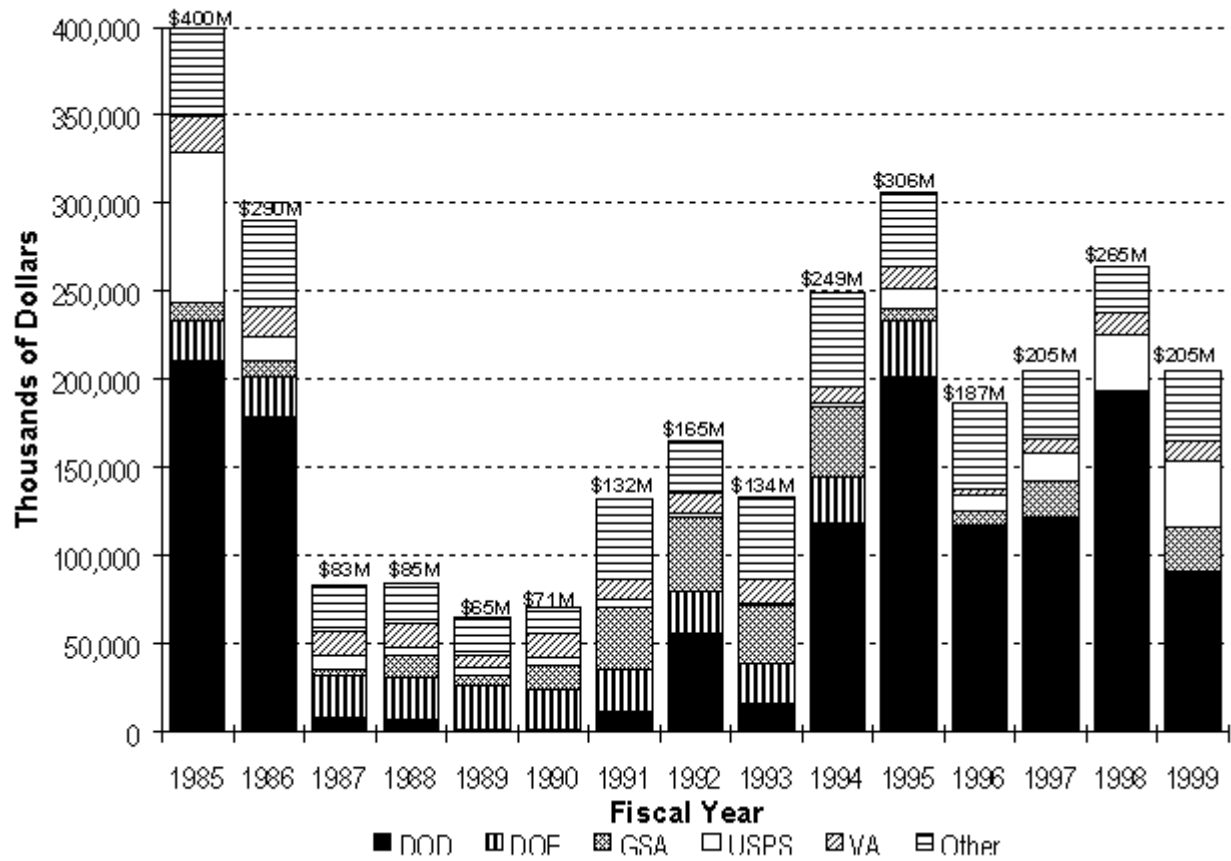
Table 3-B
Agency Expenditures for Energy Conservation Retrofits and Capital Equipment,
FY 1985 through FY 1999 (Thousands of Constant 1999 Dollars)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Projected 2000
DOC	0	0	0	0	0	0	0	991	0	55	0	0	0	334	0	0
DOD	210,355	179,372	8,032	6,839	1,870	1,223	11,601	56,442	15,978	118,093	201,060	117,174	121,895	193,968	91,243	53,756
DOE	22,875	21,674	23,878	24,482	24,190	23,381	23,666	23,466	23,175	26,923	32,025	0	0	0	0	0
DOI	4,943	8,274	0	0	5,409	0	1,476	11,136	5,375	1,801	826	928	0	162	1,730	851
DOJ	0	0	0	253	603	7,314	30,626	0	0	1,391	1,054	1,624	2,142	1,520	1,615	1,471
DOL	368	46	153	184	728	20	41	18	0	0	0	381	0	0	40	196
DOT	21,097	22,422	17,517	16,451	3,626	0	534	163	656	6,468	4,022	2,693	3,254	3,040	9,005	9,608
EPA	0	0	0	0	0	0	0	0	553	0	1,824	1,667	1,639	0	0	0
GSA	10,355	9,118	4,197	12,176	6,070	13,339	34,945	42,045	33,186	40,087	7,680	7,708	20,492	0	25,000	0
HHS	0	0	0	553	532	512	495	0	2,005	2,075	1,348	2,788	2,950	2,229	4,793	7,650
HUD	0	0	0	0	0	0	0	0	48	33	46	0	2,477	0	0	0
NASA	18,238	18,087	2,460	1,813	5,610	3,529	8,766	8,052	27,735	26,715	21,915	31,527	16,310	13,995	18,509	19,767
PCC	1,969	109	1,699	777	471	433	936	283	553	659	15	24	3	105	0	0
RRB	0	0	0	0	0	0	0	0	18	14	35	0	39	23	0	0
STATE	0	0	0	0	0	0	0	0	0	73	0	0	1,949	52	1,283	0
TRSY	0	0	4,308	3,100	3,520	1,360	970	0	1,487	5,229	2,980	177	3,064	1,418	1,495	980
TVA	0	0	0	0	0	0	0	0	525	914	4,536	544	1,186	1,485	1,022	735
USDA	3,864	0	0	648	623	1,855	2,032	8,295	7,793	7,884	3,069	6,232	3,987	1,788	994	0
USPS	85,471	13,901	7,381	4,922	4,988	4,796	4,640	2,606	1,235	1,217	10,657	9,375	16,393	31,408	38,000	14,706
VA	20,093	17,190	13,748	12,772	6,858	13,429	11,566	11,364	13,385	9,805	12,683	3,854	7,582	13,171	10,500	10,294
Total	399,629	290,193	83,373	84,970	65,099	71,192	132,295	164,861	133,706	249,434	305,775	186,696	205,363	264,699	205,184	120,014

Notes: **Bold** indicates top five energy users in buildings and facilities (DOD, DOE, VA, USPS, GSA). In past years, DOE also included funds for energy surveys. Does not include energy savings performance contracts and utility demand side management incentives.

Source: Federal Agency Annual Energy Management Data Reports

FIGURE 4
Energy Conservation Retrofit Expenditures
(In Constant 1999 Dollars)



Source: Federal Agency Annual Energy Management Data Reports

Federal Energy Efficiency Fund

The Federal Energy Efficiency Fund (Fund) was established by section 152 of EPACT, which amended section 546 of NECPA, to provide grants to agencies to assist them in meeting the mandated energy efficiency and water conservation requirements. The limited spending authority available in FY 1994 and FY 1995 was applied to those proposals which were most competitive, considering the five following factors:

1. The cost-effectiveness of the project (saving-to-investment ratio).
2. The net dollar cost savings to the Federal Government.
3. The amount of energy savings to the Federal Government.
4. The amount of funding committed by the agency requesting financial assistance.
5. The amount of funding leveraged from non-Federal sources.

No spending authority has been provided beyond FY 1995. A total of 114 proposals were received during FY 1994 and FY 1995 and Fund grants were provided for 37 projects. Of these, 35 projects provide energy savings of 5.8 trillion Btu and two projects result in water conservation in the amount of 738 million cubic feet, with an estimated energy and water cost savings of \$54 million (before payback of the initial investment) over the useful lives of the projects. The total Fund investment to realize these savings was \$7.9 million, which leveraged \$3.6 million in Federal-agency funding and \$0.9 million in non-Federal funding. The projects encompass 14 states and the District of Columbia, with one project located in the Caribbean. A summary of the funded projects is shown on the next page.

EPACT, 42 U.S.C. § 8258, requires energy and cost savings to be reported annually after completion of construction, for each project funded under the Federal Energy Efficiency Fund. Of the 37 funded projects, 25 are complete and operational, realizing annual energy and cost savings which equal or exceed the values projected in the original proposals for Fund grants. Six energy efficient lighting projects, two water projects, and one each HVAC, chiller, and natural gas conversion projects remain under construction for completion by the end of FY 1998. These projects have been integrated into other non-Fund building upgrades funded by the respective agencies, resulting in longer time periods required for completion. In some cases, mission requirements have also limited building access.

Three Federal Energy Efficiency Fund projects will each put in place one base-wide energy savings performance contract (ESPC) for the U.S. Coast Guard in Honolulu, HI, and the National Park Service for the Presidio of San Francisco, CA, and two ESPCs will be put in place for the U.S. Army at Fort Huachuca, AZ. One of the Fort Huachuca projects and the U.S. Coast Guard project will install renewable energy solar hot water systems.

Federal Energy Efficiency Fund Projects - FY 1999 Status

Agency	State	Project Description	Funds Awarded	Installation Status (Percent Complete)
DOC - NOAA	WA	NW Fish Science Center - Fish Culture System	\$471,399	100%
DOD - US Army	AZ	Solar and Base-wide Upgrades	\$310,000	15%
DOI - National Park Service	UT	Dangling Rope Marina - PV System	\$350,000	100%
DOI - National Park Service	DC	White House - Transformer & NPS Detailee	\$74,000	100%
DOI - National Park Service	WY	Yellowstone NP - Lighting, Heat, & Insulation	\$455,665	100%
DOI - National Park Service	WY	Yellowstone NP - Phase 2 Lighting, Heat, & Insulation	\$174,500	95%
DOI - National Park Service	CA	Channel Island Santa Rosa Island - Wind & PV System	\$272,394	95%
DOI - National Park Service	CA	Yosemite National Park - Lighting Retrofit	\$73,621	100%
DOI - National Park Service	CA	Golden Gate NRA, Presidio - Lighting Retrofit	\$175,000	50%
DOL - Job Corps Center	MT	Electric to Natural Gas Conversion	\$225,000	100%
DOT - FAA	OH	Lighting Retrofit	\$103,706	100%
DOT - Coast Guard	AK	Used Oil Processing Facility	\$530,000	100%
DOT - Coast Guard	MD	USCG Yard, Lighting Retrofit	\$80,671	100%
DOT - Coast Guard	HI	Housing Area - Solar Water Heating	\$100,000	100%
Treasury - US Mint	PA	Lighting Retrofit	\$103,180	100%
Exec. Residence Agency	DC	White House - Lighting Retrofit & Refrigerator	\$50,477	100%
HHS - NIH/National Cancer Inst.	MD	Chiller Installation	\$283,463	56%
HHS - NIH/National Cancer Inst.	MD	Occupancy Sensor Installation	\$129,090	25%
NASA - Dryden	CA	Edwards AFB Bldg #4800 Lighting Retrofit	\$265,414	100%
NASA - Goddard	MD	Bldg's #17, 21, 22, & 23 Lighting Retrofit	\$286,715	100%
NASA - Goddard	MD	E-Building Complex Lighting Retrofit	\$94,812	100%
NASA - Kennedy	FL	Bldg M7-505 Lighting Retrofit	\$144,500	100%
NASA - Kennedy	FL	Bldg M6-336 Lighting & HVAC Retrofits	\$41,800	100%
NASA - Kennedy	FL	Bldgs M6-339 & M7-581 Lighting Retrofit	\$36,942	100%
NASA - Kennedy	FL	Hanger L, Bldg 1732 Lighting & HVAC Mods	\$88,900	100%
NASA - Kennedy	FL	Launch Complex 39 Lighting Retrofit	\$106,050	100%
NASA - Marshall	AL	Bldg. 4610 Lighting Modifications	\$120,000	91%
NASA - Marshall	AL	Building 4250 Water Conservation	\$116,500	91%
National Gallery of Art	DC	HVAC Automation System	\$2,000,000	95%
Smithsonian Institution	MD	Support Center - Phases 3, 4, & 5 Lighting	\$100,000	100%
Agency for Int'l Development	Jamaica	Executive Office Bldg - Lighting & Windows	\$69,798	100%
USDA - Agric. Research Service	MD	Bldg 011A - Fluorescent Lamp Retrofit	\$3,640	100%
USDA - Agric. Research Service	MD	Bldg 011A - Lighting Occupancy Sensors	\$33,326	100%
USDA - Forest Service	AZ	Apache-Sitgreaves NF Lighting Retrofit	\$35,000	100%
USDA - Forest Service	AZ	Kaibab NF - Replace Telephone Switch	\$66,500	100%
USDA - Forest Service	CA	Shasta-Trinity NF - NCSC Lighting Retrofit	\$28,500	100%
US Soldiers & Airmen's Home	DC	Lighting Retrofit	\$274,677	100%

Energy Savings Performance Contracting

Section 155 of EPACT amended Title VIII of NECPA, sections 801 and 804, relating to energy savings contracts. Section 801, as amended, gives agencies the authority to enter into energy savings performance contracts (ESPCs) and describes the methodology of contract implementation. The ESPC program was created to provide agencies with a quick and cost-effective way to increase the energy efficiency of Federal buildings. Under an ESPC, a private sector energy service company (ESCO) will assume the capital costs of installing energy and water conservation equipment and renewable energy systems. The ESCO guarantees the agency a fixed amount of energy cost savings throughout the life of the contract and is paid directly from those cost savings. Agencies retain the remainder of the energy cost savings.

On April 10, 1995, DOE published in the *Federal Register* (10 CFR Part 436) a final rule that sets forth the regulations for energy savings performance contracting and achieved the directive to substitute regulations for certain provisions in the FAR. On April 18, 1995, DOE published a correction that changed the effective date of the final rule from May 10 to April 10, 1995.

An application process for a Qualified List of ESCOs was also released with the ESPC regulations. Only firms on the Qualified List may receive an ESPC award. Firms that wish to be on the Qualified List must submit an application to DOE and possess the required experience and expertise. The List is continually updated.

On November 2, 1998, the Energy Conservation Reauthorization Act was signed by the President to become Public Law 105-388. The law makes several significant changes to EPACT and NECPA. Section 4 of Public Law 105-388 amends NECPA section 801 to extend the authority of Federal agencies to enter into ESPCs through September 30, 2003. Without this amendment, the authority would have expired on April 10, 2000. Section 4 also amends the definition of "Federal agency" in NECPA Section 804 to include each authority of the U.S. Government, whether or not it is within or subject to review by another agency.

On June 3, 1999, the President signed Executive Order 13123, *Greening the Government Through Efficient Energy Management*. Section 403(a) states that "Agencies shall maximize their use of available alternative financing contracting mechanisms, including Energy Savings Performance Contracts." This Section goes on to state that "Energy Savings Performance Contracts...provide significant opportunities for making Federal facilities more energy efficient at no net cost to taxpayers." Inherent to implementation of the ESPC regulation is the necessity for action by senior agency officials, agency priority on employing ESPCs, development and maintenance of trained and dedicated procurement personnel, and accountability for results.

During FY 1999, 13 conventional ESPCs were awarded. Total contractor investment from these projects is more than \$87 million, providing the Government with an opportunity to save millions of dollars in energy costs during the life of the contracts. These ESPCs include seven by the United States Postal Service, four by the Department of Defense, and one each by the Department of the Treasury and the National Aeronautic and Space Administration.

**Conventional Energy Savings Performance Contracts Awarded
by Federal Agencies in FY 1999**

Project Name/Location	Project Description	Contractor Investment	Savings
Dept. of Defense, U.S. Army, Military District of Washington	Lighting retrofit, building automation systems, building envelope modifications, and boiler, chiller, and water/sewer system upgrades	\$67,090,407	Annual savings of \$11,898,523
Dept. of Defense, U.S. Marine Corps, Marine Corps Base Kaneohe Bay, Oahu, Hawaii	Chiller upgrades	\$55,260	Not available
Dept. of Defense, U.S. Marine Corps, Marine Corps Base Kaneohe Bay, Oahu, Hawaii	Hot water decentralization	\$3,349,600	Not available
Dept. of Defense, U.S. Army, West Point Keller Hospital, West Point, New York	HVAC upgrades	\$1,152,887	Not available
Dept. of the Treasury, U.S. Secret Service, Beltsville, Maryland	Lighting retrofits, day lighting	Not available	Annual savings of \$39,000
NASA, Goddard Space Flight Center, Greenbelt, Maryland and Wallops Flight Facility, Wallops Island, Virginia	Lighting retrofits through two delivery orders under two GSFC IDIQ contract awarded to two ESCOs	Each IDIQ has a maximum value of \$5 million	The first two delivery orders will produce annual savings of \$50,000
USPS, New Jersey	Lighting retrofits	\$8,450,000 investment in 7 facilities	Annual savings of \$1,300,000
USPS, West Chester, New York	Lighting retrofits	\$210,000 investment in 6 facilities	Annual savings of \$54,800
USPS, Dallas, Texas	HVAC upgrades, lighting retrofits	\$2,774,000 investment in 8 facilities	Annual savings of \$403,226
USPS, Atlanta BMC, Georgia	Lighting retrofits, HVAC upgrades	\$155,000 investment in 1 facility	Annual savings of \$25,000
USPS, Suncoast District, Florida	Not available	\$660,000 investment in 17 facilities	Annual savings of \$110,000
USPS, Las Vegas, Nevada	Lighting retrofits, air compressor	\$221,000 investment in 1 facility	Annual savings of \$32,715
USPS, Tulsa, Oklahoma	HVAC upgrades, lighting retrofits	\$1,310,953 investment in 1 facility	Annual savings of \$187,955

The ESPC covering the Military District of Washington is the single largest ESPC any Federal agency has awarded. Through a partnership between the Defense Logistics Agency's Defense Energy Support Center (DESC), the U.S. Army's Military District of Washington (MDW), and the National Renewable Energy Laboratory (NREL) savings of over \$100 million will be achieved over the 18-year contract period at 837 buildings across the five participating installations (Fort Belvoir, Fort A.P. Hill, Fort Myer, Fort McNair, and Fort Meade). Utilizing "best value" buying techniques, DESC, in conjunction with its Government partners, determined that the Viron/Pepco Services offer provided the greatest overall benefits to the Government in the areas of energy engineering, equipment installation, construction supervision, commissioning, and measurement and verification. All capital investments will be made within the first three years of the contract. As a result of this ESPC, the five installations will have their overall energy consumption reduced by at least 23 percent in comparison to 1998 levels by 2005. This translates into annual reductions of 89 million kilowatt-hours of electricity and 294 billion Btu in fuel.

However, awarding ESPCs on a one-by-one basis has often proven to be complex and time consuming. To make it easier to use ESPCs, DOE's Federal Energy Management Program (FEMP) has developed Regional and Technology-Specific Super ESPCs. Both Regional and Technology-Specific Super ESPCs share the same general contract terminology and provisions with conventional ESPCs and they present several significant advantages to Federal agencies.

Super ESPCs are unlike conventional ESPCs in two fundamental ways. First, a Super ESPC blankets a large geographic territory; a conventional ESPC is used for a specific site. The second, and real benefit to agencies, is that Super ESPCs substantially reduce the lead time to contract with an energy savings company (ESCO) for energy services. Super ESPCs are broad area indefinite delivery, indefinite quantity (IDIQ) contracts that allow agencies to negotiate site-specific delivery orders with an ESCO without having to start the contracting process from scratch. Demand on agency resources to develop and award contracts, as well as lead times, will be greatly reduced, and energy savings will be realized more quickly.

The Western Regional Super ESPC was awarded to five ESCOs in May 1997. The Southeast, Midwest, and Central Regional Super ESPCs were awarded to various ESCOs during FY 1998. On March 1, 1999 the Mid-Atlantic Regional Super ESPC (covering Delaware, Maryland, New Jersey, Pennsylvania, Virginia, West Virginia, and the District of Columbia) was awarded to six ESCOs (ERI Services, EUA Cogenex, HEC Energy and Design Services, Honeywell, NORESO, and Siebe Government Services). Also on March 1, 1999, the Northeast Regional Super ESPC (covering Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont) was awarded to seven ESCOs (CES/Way International, ERI Services, HEC Energy and Design Services, Honeywell, Johnson Controls Government Services, Siebe Government Services, and XENERGY). Each Regional Super ESPC has a contract ceiling of \$750 million.

During FY 1999, 16 Regional Super ESPC delivery orders were awarded. Total contractor investment is more than \$44 million, providing very significant energy and cost savings to the Government. These delivery orders include three by the Department of Defense and the Department of Transportation, two by the Department of the Interior, the Department of

Veteran's Affairs, and the National Aeronautics and Space Administration, and one each by the Department of Energy, the Department of Labor, the General Services Administration, and the National Archives and Records Administration. Many more delivery orders are expected to be awarded during FY 2000.

DOE Regional Super ESPC Delivery Orders

Project Name/Location	Project Description	Contractor Investment	Savings
Dept. of Defense, DOD Center Monterey Bay, California	Lighting retrofit, energy management and control system, and boiler, HVAC, and hot water/steam system upgrades, and efficient motors	\$1,891,128	Annual savings of \$354,738
Dept. of Defense, U.S. Navy, U.S. Naval Submarine Base, Bangor, Washington	Lighting retrofit, energy management and control system, and upgrades to the chiller and hot water/steam systems	\$663,559	Not available
Dept. of Defense, U.S. Navy, Port Mugu Naval Air Weapons Station and Naval Construction Battalion Center, Port Hueneme, California	Lighting retrofit, energy management and control system, HVAC, boiler and chiller system upgrades, and hot water pipe insulation	\$1,699,458	Not available
Dept. of Transportation, U.S. Coast Guard, Integrated Support Command, Alameda, California	Lighting retrofit, building automation systems, and HVAC system upgrades	\$1,149,112	Not available
Dept. of Transportation, U.S. Coast Guard, Integrated Support Command, Kodiak Island, Alaska	Lighting retrofit, upgrades to steam, water, and heat recovery systems This is the second delivery order on this site	\$3,166,628	Not available
Dept. of Transportation, U.S. Coast Guard, Support Center, Elizabeth City, North Carolina	Lighting retrofit, efficient motors and drives, building automation systems, rate reductions and audits, and water and sewer system upgrades	\$1,830,611	Annual savings of \$271,140
Dept. of the Interior, National Park Service, Yosemite National Park, California	Lighting retrofit, efficient motors and drives, building automation systems, and upgrades to boiler, HVAC, and electric distribution systems	\$584,535	Annual savings of \$81,539
Dept. of the Interior, Bureau of Indian Affairs, Chemawa Indian School, Salem, Oregon	Building automation systems, building envelope modifications, efficient motors and drives, and boiler and HVAC system upgrades	\$1,546,684	Annual savings of \$159,361
Dept. of Veteran's Affairs, VA Domiciliary, White City, Oregon	Lighting retrofit, building automation systems, upgrades to the HVAC system	\$395,629	Annual savings of \$64,734

Project Name/Location	Project Description	Contractor Investment	Savings
Dept. of Veteran's Affairs, Medical Center, Grand Junction, Colorado	Lighting retrofit, upgrades to the steam, water, and heat recovery systems	\$755,857	Annual savings of \$81,539
NASA, Johnson Space Center, Houston, Texas	Lighting retrofit, compressed air system modifications, variable speed pumping systems, cooling tower control systems, water conservation measures, energy management control system installation, HVAC control system upgrade	\$21,000,000	Annual savings of \$2,074,000
NASA, Glenn Research Center at Lewis Field, Cleveland, Ohio	Lighting retrofit and boiler improvements	\$1,747,830	Annual savings of \$275,127
Dept. of Energy, Oak Ridge National Laboratory, Oak Ridge, Tennessee	Lighting retrofit and water conservation	\$279,462	Annual savings of \$37,797
Dept. of Labor, Job Corps Centers, San Bernadino and Sacramento, California	Lighting retrofit	\$169,170	Annual savings of \$29,267
General Services Administration, bundled sites, Atlanta, Georgia	Lighting retrofit, efficient motors and drives, and chiller and HVAC system upgrades	\$7,045,074	Annual savings of \$1,005,386
National Archives and Records Administration, Eisenhower Museum and Library, Abilene, Kansas	Lighting retrofit, energy management and control system, and steam trap replacements	\$266,431	Annual savings of \$35,914

Technology-Specific Super ESPCs emphasize a particular advanced energy-efficiency or renewable energy technology to advance these proven yet still emerging technologies in the Federal marketplace. They blanket the entire nation and carry the same agency resource and time saving benefits as Regional Super ESPCs. ESCOs chosen for these awards have unique capabilities and experience in providing energy savings through installation of the technology, thereby greatly reducing the risks of misapplying emerging technologies. Technology-Specific Super ESPCs can also be comprehensive projects employing multiple energy conservation measures, as long as the named technology is the focus of the project.

The first Technology-Specific Super ESPC was awarded in September 1996 to provide solar hot water heating with parabolic troughs. Contract value is \$30 million. During FY 1998, the photovoltaics Technology-Specific Super ESPC was awarded to two ESCOs. This contract is worth \$50 million. In February 1999, the geothermal heat pump Technology-Specific Super ESPC was awarded to five ESCOs (Constellation Energy Source, DukeSolutions, The Enron Team, Exelon Energy Services, and The Trane Company). This contract is worth \$500 million. Over the next several years more Technology-Specific Super ESPCs will be awarded covering a wide range of energy and cost saving technologies.

Utility Partnerships

Although the availability of utility-sponsored demand side management programs is waning, Federal agency reports identified the receipt of at least \$2.6 million in incentive rebates in FY 1999. Utility incentive activities reported by the agencies occurred at installations widely distributed across the country. This decentralization of utility incentive participation makes it difficult for agencies to track all utility incentive activities undertaken by all respective sub-agencies, bureaus, and field offices. Total utility incentive benefits received by the Federal Government as a whole for FY 1999 are therefore assumed to be greater than reported.

Under incentive programs, utilities offer rebates to the customer which partially fund and help to promote the installation of new, more efficient equipment such as lighting systems, insulation, cooling equipment, and high efficiency motors. The customer, in this case the Federal Government, is then required to finance the remainder of the equipment cost. Utility incentive programs provide leverage for the user's investment dollars and at the same time help the utility to avoid the cost of building new power plants. EPACT and Executive Orders 12902 and 13123 place heavy emphasis on utility incentive as a means for Federal agencies to achieve energy conservation.

The following agencies reported participation in demand side management programs in FY 1999:

- Department of Defense,
- Department of Energy,
- Department of the Interior,
- Department of Transportation,
- Department of the Treasury,
- General Services Administration,
- Health and Human Services,
- Housing and Urban Development, and
- National Aeronautics and Space Administration.

F. Life-Cycle Costing (LCC)

Section 544 of NECPA, as amended in 1988, requires DOE to establish practical and effective methods for estimating and comparing the life-cycle costs for Federal buildings using the sum of all capital and operating costs for energy systems of new buildings involved over the expected life of such systems or during a period of 25 years, whichever is shorter, and using average fuel costs and a discount rate determined by the Secretary of Energy. In addition, section 544 requires that procedures be developed in applying and implementing the methods that are established. EPACT further amends NECPA to require, after January 1, 1994, agencies which lease buildings to fully consider the efficiency of all potential building space at the time of renewing or entering into a new lease.

On November 20, 1990, DOE issued a Notice of Final Rulemaking to amend Title 10 of the Code of Federal Regulations, Part 436, which sets forth guidelines applicable to Federal agency in-house energy management programs. The principal regulatory changes involved amending the

life-cycle cost methodology and procedures to provide for an annually determined, market-based discount rate and for a more effective system to revise annually the energy cost escalation rates that Federal agencies are required to assume. In developing the final amendments, the Department of Energy actively consulted with the Office of Management and Budget, the Department of Defense, and the General Services Administration.

In the past, DOE's Federal Energy Management Program has published updated fuel price projections for life-cycle cost analyses on October 1 of each year to coincide with the beginning of the fiscal year. The FY 1999 update of the *Energy Price Indices and Discount Factors for Life-Cycle Cost Analysis, Annual Supplement to Handbook 135* was published and distributed to Federal energy managers in April 1998.

G. Procurement Policy

The U.S. Government is the single largest user of energy in the world. Not surprisingly, it is also the largest purchaser of energy-related products, buying an estimated \$10 to \$20 billion worth each year for its buildings. Consequently, there is an enormous potential for energy and dollar savings through procurement policies emphasizing energy efficiency. Such policies not only save taxpayer dollars, but also decrease the emission of air pollutants associated with fuel combustion (both directly and in the generation of electricity), while simultaneously expanding the overall market for energy-efficient products.

Executive Order 13123, "Greening the Government through Efficient Energy Management," directs Federal agencies to purchase ENERGY STAR labeled products, or, for those product types not covered by the EPA/DOE ENERGY STAR labeling program, products "in the upper 25 percent of energy efficiency as designated by FEMP." Reinforcing the message is a stipulation in the Federal Acquisition Regulations (48 CFR 23.704) that "Agencies shall implement cost-effective contracting preference programs favoring the acquisition of . . . energy-efficient products. . . , i.e., products that are in the upper 25 percent of energy-efficiency for all similar products." This FAR provision was initiated in response to Executive Order 12902 (1994), and efforts are presently under way to modify the language in accordance with E.O. 13123 (e.g., to refer to ENERGY STAR products).

The ENERGY STAR labeling program is a joint effort between EPA and DOE to get manufacturers (and some retailers) to identify efficient products with an easily recognizable logo, the ENERGY STAR. Since this is a nation-wide labeling program covering multiple products, it makes it very simple for customers to identify truly efficient models among those offered – for instance, on a retail floor, or among various models listed in a product catalog. Presently, the program includes a wide variety of office equipment and home heating and cooling products, as well as many consumer audio and video products (e.g., TVs, VCRs, and DVD players), appliances, and residential windows. Some commercial equipment, such as exit signs, low-voltage distribution transformers, and roof products, is also covered.

To assist Federal agencies in meeting the requirements of the Executive Order and FAR directives, FEMP publishes a series of *Product Energy Efficiency Recommendations*, which delineate the efficiency levels that meet the ENERGY STAR and "upper 25%" requirements of the

Executive Order. The *Recommendations* also provide cost-effectiveness examples, tips on important product selection parameters such as sizing and fuel choice, and leads to the Federal supply agencies (the Defense Logistics Agency and the General Services Administration) that offer efficient models. The *Recommendations*, which now cover more than 30 products, are available on FEMP's Web site at www.eren.doe.gov/femp/procurement, as well as in print, through a loose-leaf binder called "Buying Energy Efficient Products." The binder is available free of charge from FEMP's clearinghouse (800-363-3732); subscribers receive new and updated material as it is printed, approximately every six months.

To be most effective, FEMP's product efficiency recommendations need to be incorporated into other purchasing guidance, such as technical specifications and agency-specific policies and practices. Pursuant to this concern, FEMP has made considerable progress in partnership with the two major Government supply agencies, DLA and GSA. FEMP is working with GSA's Federal Supply Service arm and with DLA to identify energy-efficient equipment among supply offerings. As a result of FEMP's joint effort with GSA/FSS on electronic product coding, GSA customers shopping on-line can, in most cases, distinguish models that are ENERGY STAR compliant.

DLA's customers rely heavily on the information in the Federal Logistics Information System (FLIS) database to procure products and equipment. The FLIS catalogs millions of items by "national stock numbers" (NSNs), which can be accessed by vendor name or code. DLA has established a database "field" highlighting positive environmental attributes (such as energy-efficient or made from recycled material) within the FLIS, and has utilized the FEMP efficiency thresholds as its definitions for "energy-efficient" and "water-conserving" (for plumbing fixtures such as showerheads and toilets).

FEMP's biggest success to date with its energy-efficient purchasing program has been the incorporation by several large Federal construction agencies of FEMP-recommended product efficiency levels into agency master, or guide, specifications for construction and major renovation. When an agency writes a FEMP recommendation into a "guide spec" for a given product, it generally assures that virtually all the buildings constructed by that agency will use only models that comply with the highly efficient levels – affecting millions of dollars worth of product. On the vanguard of this movement are the Army Corps of Engineers and the Navy. Products for which guide specifications incorporating FEMP's recommended efficiency levels had been written by the end of fiscal year 1999 include electric chillers, fluorescent lighting, exit signs, distribution transformers, and roof products.

H. Public Education Programs

NECPA, 42 U.S.C. § 8258(b), requires the Secretary of Energy to include in this and subsequent annual reports information on public education programs carried out by Federal agencies and previously reported under the authority of section 381 of the Energy Policy and Conservation Act (EPCA), 42 U.S.C. § 6361(b).

EPCA requires the Secretary of Energy to establish and carry out public education programs to encourage energy conservation and energy efficiency and to promote vanpooling and carpooling

arrangements. The Department of Transportation (DOT) has promoted ride sharing activities, while DOE has been responsible for other energy conservation education programs.

Through its Federal Highway Administration, DOT obligates Federal aid funds to assist State and local agencies in implementing programs designed to encourage the use of car pools, van pools, and buses by commuters. DOT efforts have included van pool acquisition programs, fringe and corridor parking facilities, ride-matching projects, preferential treatments for high occupancy vehicles, and transit service improvement. Since 1974, more than \$875 million in Federal aid highway funds have been spent on such projects in an effort to establish self-sufficient programs across the Nation.

The Department of Transportation's Technology Sharing Program (TSP) makes high quality reports in a user-friendly format available to the non-scientist or technical person to understand and act on transportation problems of state and local governments. This low-cost program disseminates technical reports on a variety of topics to this user community, thus saving them the time and cost of researching the information on an individual basis, or not having the information at all. The TSP products consist of reports, manuals, and summary documents which can be ordered at the following Internet site: <http://www.tsp.dot.gov/cgi-bin/borwsere.pl>. Subjects include commuter issues and travel demand, traffic congestion, land-use development, and risk assessment. In addition, a variety of products of the National Science and Technology Council's Subcommittee on Transportation R&D are also available through the site.

The Department of Energy's public education programs encompass a wide variety of services, objectives, and audiences, covering all major areas of conservation and renewable energy. DOE has organized its technology transfer programs to meet the specific information requirements of various audiences.

Three services are managed through subcontracts at the National Renewable Energy Laboratory (NREL): DOE's Energy Efficiency and Renewable Energy Clearinghouse (EREC), DOE's Energy Efficiency and Renewable Energy Network (EREN), and the FEMP Help Desk.

EREC provides basic, technical, and financial information on various energy efficiency and renewable energy technologies and programs. The audience served by EREC includes the general public, business and industry, educational community, media, utility companies, and state and local governments. Information is provided in the form of fact sheets, DOE and National Laboratory books and brochures, bibliographies, and on-line computer-generated technology synopses. Some requests are handled completely over the phone and the caller receives no publications. EREC's telephone number is 800-DOE-EREC (800-363-3732) and its Web site is at www.eren.doe.gov/consumerinfo. In FY 1999, EREC staff responded to 70,296 inquiries and disseminated 373,672 publications.

EREN is the official Web site of the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE). The audience served by EREN includes business and industry, the general public, the educational community, the media, and state and local governments. EREN's Web address is www.eren.doe.gov. In 1999, EREN averaged 86,000 unique users per month, and 5 million hits per month. The site is a comprehensive resource for energy

information, providing links to more than 600 energy-related Web sites, allowing keyword searches, and offering a full range of information on topics such as building energy efficiency, wind power, and alternative fuels. In addition, EERE provides its organizational chart, major initiatives, and budget. The site also features current press releases, consumer information, and lists of discussion groups on various energy-related topics. There are even forms to submit energy-related questions and to subscribe to the EREN Network News e-mail newsletter.

The Federal Energy Management Program (FEMP) Help Desk provides Federal energy managers with specialized information on effective energy management practices, technical assistance on implementing Federal sector energy projects, financing information, energy modeling software, publications, and energy management training programs. The Help Desk responds to requests for information via a toll-free telephone service, electronic mail, and through the Internet. The Help Desk was merged into EREC in FY 1997. The telephone number is 800-DOE-3732. The Web site is www.eren.doe.gov/femp.

The National Energy Information Center (NEIC) responds to public and private sector questions on energy production, consumption, prices, resource availability, and projections of supply and demand. It also makes available the publications produced by the DOE Energy Information Administration. NEIC provides information to Federal employees and the public at www.eia.doe.gov. Electronic inquiries may be sent to infoctr@eia.doe.gov. In 1999, NEIC staff responded to 25,049 inquiries and distributed approximately 30,635 publications.

The Office of Scientific and Technical Information (OSTI), as part of the Office of Science, provides coordination and direction for the management of scientific and technical information resulting from the DOE's multi-billion dollar research and development activities. As a cross-cutting Headquarters office, OSTI accomplishes its mission through the Scientific and Technical Information Program (STIP). STIP operates in partnership with program offices, operations offices, and contractors to develop and implement information management "best business practices" to ensure that DOE maximizes the return on its \$6 billion annual R&D investment.

In support of national competitiveness, OSTI collects, processes, and disseminates DOE-originated research information and selected worldwide research literature on subjects of interest to domestic communities. OSTI also provides scientific and technical information services to, or on behalf of, DOE elements in support of Departmental mandates, missions, and objectives. OSTI serves the public directly or indirectly through agreements with the National Technical Information Service, Government Printing Office, depository libraries, and commercial vendors. EnergyFiles is a publicly available, web-based gateway to a wide array of energy-related information. Included among the EnergyFiles family is the DOE Information Bridge, an electronic full-text collection of 26,000 documents available to the DOE research community.

OSTI manages a comprehensive collection of approximately one million scientific and technical information documents, representing 50 years of energy-related activities. The organization also maintains the Energy Science and Technology Database (EDB), which has more than 3.5 million summaries of DOE and worldwide information. EDB is made available to the public on-line and on CD-ROM through commercial vendors. The majority of its users are industry, Federal and State officials, contractors, libraries, research institutions, and the public. In FY 1999, OSTI

added more than 110,879 research summaries to the database and provided 18,356 full-text documents for public availability to the National Technical Information Service and the Government Printing Office Depository Library Program.

FY 1999 initiatives included a strategic effort to process and disseminate information in an increasingly decentralized environment. As a continuing step towards a “National Library of Energy Science and Technology,” the effort will significantly improve DOE and public access to bibliographic and full-text information without major additional investment. In addition to the core program activities, OSTI’s other services include developing Internet-based applications for DOE offices, providing information management advice and consultation to the Departmental community, managing and disseminating DOE and Nuclear Regulatory Commission scientific and technical software, and representing the United States in multilateral and bilateral international information exchange agreements.

The DOE public information mechanisms include several direct service programs designed to provide technical assistance to specific target groups. Some of these include:

- The State Energy Program, a formula grant program, which provides a flexible, supportive framework to enable the States to address their own energy priorities, as well as focus on national initiatives and strengthens their capabilities to deliver energy services. This customer-driven program seeks to increase the extent to which Federal, State, and local governments work with other public and private sector entities to achieve widespread adoption of available energy efficiency and renewable energy technologies, and to demonstrate the use of emerging technologies which benefit the entire economy.
- The Special Projects component of the State Energy Program offers States the opportunity to apply for competitively selected grants covering a wide range of activities that may expand upon a State’s formula grant activities or offer an opportunity to take new initiatives. These projects are designed to utilize the State’s unique and effective skills in forming and sustaining partnerships with local governments, industry, utilities, and private organizations. Many of these projects involve the dissemination of information about, and/or the demonstration of the viability of a variety of energy efficiency and renewable energy applications.
- The Industrial Assessment Center (IAC) Program provides no-cost energy, waste, and productivity assessments to help small and mid-sized manufacturers identify measures to maximize energy-efficiency, reduce waste, and improve productivity. The assessments are conducted by local teams of engineering faculty and students from 30 participating universities across the country. This program not only improves manufacturing efficiency, but at the same time provides valuable, hands-on technical training and experience for engineering students throughout the U.S. Additional information can be obtained by visiting the program Web site at www.oit.doe.gov.

A full list of DOE’s energy education, extension, and information services is provided in Appendix E to this report.

II. ENERGY MANAGEMENT IN BUILDINGS AND FACILITIES

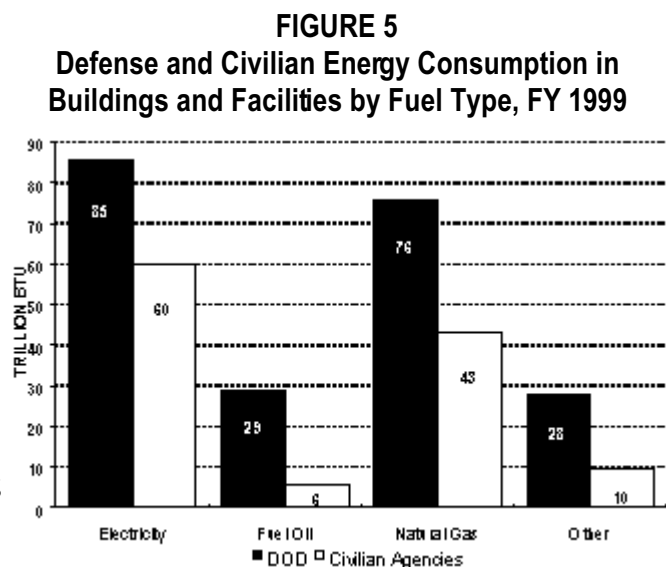
A. Energy Consumption and Costs for Buildings and Facilities

The Federal Government provides energy to approximately 500,000 buildings and facilities comprising approximately 3.1 billion square feet of floor area. This energy is used to provide lighting, heating, ventilation, air conditioning, and other standard building services, as well as a significant amount of process operations that are not reported separately.¹¹ Federal buildings include both Federally-owned and leased buildings. However, in many instances the lessor pays the energy bill, and consumption and cost data may not be available to the Government. Accordingly, Federal agencies report data for leased space to the maximum extent practicable.¹²

Table 4-A shows the total primary energy consumed in Federal buildings and facilities, including energy resources used to generate, process, and transport electricity and steam.¹³ Primary energy consumed in buildings and facilities in FY 1999 decreased 16.7 percent from FY 1985 and 0.4 percent from FY 1998.

Table 4-B shows that agencies have decreased net energy consumption in buildings by 28.4 percent, from 470.4 trillion Btu in FY 1985 to 336.9 trillion Btu in FY 1999. A comparison to FY 1998 shows a decrease of 1.1 percent in total buildings energy consumption.

Of the 28 agencies represented on the tables for FY 1999, 11, including DOD, consume more than 98 percent of the reported buildings energy use. Energy used in buildings accounts for approximately 33.3 percent of the total 1.01 quads used by the Federal Government. The mix of Federal buildings energy use for Defense and civilian agencies is depicted in Figure 5. Electricity constitutes 43.3 percent (145.8 trillion Btu) of Federal buildings energy use; 35.4 percent is accounted for by natural gas



¹¹Process energy is that energy used in buildings for operations other than standard building services. In cases where separate reporting was not possible, due to the lack of meters or estimation techniques, process energy was reported as though it was part of the energy used for standard building services.

¹²The General Services Administration (GSA) is the primary leasing agent for the Federal Government, although most of the other agencies do have some leasing authority. In some cases, GSA will delegate operations and maintenance responsibility to individual agencies for leased space, requiring the agency to be responsible for paying the utility bills and reporting energy consumption.

¹³Source conversion factors of 10,346 Btu per kilowatt hour for electricity and 1,390 Btu per pound of steam are used to calculate primary energy consumption. See Appendix B for conversion factors for net energy consumption.

TABLE 4-A
FEDERAL PRIMARY ENERGY CONSUMPTION IN BUILDINGS AND FACILITIES
(In Billions of Btu, with Conversions to Millions of Barrels of Oil Equivalent [MBOE], and Petajoules [Joule x 10¹⁵])

CIVILIAN AGENCY	FY 1985	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	%CHANGE 85-99	%CHANGE 98-99
USPS	35,915.2	42,631.6	43,820.8	45,472.7	49,064.6	50,297.9	51,256.8	53,195.9	48,869.8	50,939.9	52,058.2	44.9	2.2
VA	39,673.2	40,902.8	41,915.5	41,740.0	42,540.0	43,113.2	43,556.3	44,780.8	45,068.6	45,496.7	45,731.8	15.3	0.5
DOE	53,246.1	50,948.4	49,154.4	52,211.1	53,011.7	51,148.3	49,739.6	49,759.9	46,277.4	45,107.4	43,445.8	-18.4	-3.7
GSA	37,553.7	32,697.3	31,461.5	31,129.0	31,050.0	30,558.4	29,845.2	31,186.6	31,339.2	31,278.2	31,527.5	-16.0	0.8
DOJ	8,531.9	8,692.4	11,106.3	8,464.4	11,128.5	10,588.5	10,996.1	13,343.0	13,678.7	14,132.4	14,696.6	72.3	4.0
NASA	6,257.3	7,333.0	7,481.2	7,254.2	7,289.4	7,375.9	7,877.4	8,613.0	9,058.4	9,132.0	8,836.0	41.2	-3.2
DOT	7,811.6	6,601.8	6,104.4	7,677.4	7,954.1	7,736.2	8,345.0	8,367.3	8,661.3	7,835.4	7,779.2	-0.4	-0.7
DOI	7,879.7	6,985.2	7,160.1	6,270.2	7,660.0	7,537.0	7,028.1	5,690.7	6,665.0	6,862.1	6,949.6	-11.8	1.3
ST ¹	6,209.8	6,323.1	6,347.8	747.0	119.9	212.2	230.4	706.0	6,531.3	6,532.6	6,173.0	-0.6	-5.5
HHS	4,581.3	14,941.5	13,252.0	14,665.0	14,849.6	15,084.4	11,005.3	11,703.6	13,264.6	5,027.0	5,076.6	10.8	1.0
USDA	4,008.4	4,937.7	5,109.3	4,855.2	4,985.2	4,785.1	4,657.8	4,831.6	4,293.5	4,538.2	4,045.5	0.9	-10.9
TRSY	1,334.9	4,540.0	3,933.6	4,350.4	3,843.4	3,936.9	3,399.3	3,287.8	4,363.8	4,126.0	4,011.4	200.5	-2.8
DOL	3,455.8	3,603.6	3,521.9	3,555.5	3,681.6	3,749.7	3,635.3	3,756.8	3,786.9	3,818.4	2,986.9	-13.6	-21.8
EPA	1,488.8	1,483.2	1,635.5	1,662.7	1,744.4	1,824.9	1,963.1	1,933.8	1,914.0	1,923.7	2,130.1	43.1	10.7
TVA	1,180.5	1,260.5	1,270.9	1,269.4	1,308.1	1,988.7	2,202.4	2,133.7	2,007.6	1,981.0	1,959.6	66.0	-1.1
DOC	1,092.9	2,946.6	2,945.7	1,340.6	1,499.9	1,851.9	1,231.1	1,190.5	1,175.6	1,090.5	1,125.3	3.0	3.2
HUD	315.2	384.2	374.3	345.2	314.4	293.4	285.2	301.4	289.7	279.9	286.8	-9.0	2.5
FCC	26.7	37.0	39.3	30.6	31.7	35.5	35.5	28.8	28.8	28.8	28.8	7.7	0.0
OTHER*	859.4	1,593.2	1,168.0	1,164.4	945.5	932.2	2,772.5	4,551.1	4,792.4	4,568.8	4,754.9	453.3	4.1
CIVILIAN AGENCIES TOTAL	221,502.9	238,929.8	237,901.0	234,296.3	243,120.5	243,145.7	240,159.4	249,460.8	252,169.5	244,699.0	243,603.5	10.0	-0.4
DOD	545,800.0	541,109.0	487,672.6	489,972.8	486,658.5	466,182.5	441,755.4	419,879.3	405,417.0	397,287.8	395,675.6	-27.5	-0.4
ALL AGENCIES TOTAL	767,302.9	780,038.8	725,573.6	724,269.1	729,779.0	709,328.2	681,914.7	669,340.0	657,586.5	641,986.7	639,279.1	-16.7	-0.4
MBOE	131.7	133.9	124.6	124.3	125.3	121.8	117.1	114.9	112.9	110.2	109.7		
Petajoules	809.5	822.9	765.5	764.1	769.9	748.3	719.4	706.1	693.7	677.3	674.4		

DATA AS OF 10/26/00

*Other includes for certain years the CFTC, CIA, EEOC, FEMA, FTC, NARA, NSF, NRC, OPM, RRB, SSA, USA, and FERC.

Note: This table uses a conversion factor for electricity of 10,346 Btu per kilowatt hour and 1,390 Btu per pound of steam. Contains estimated data for the following agencies: FEMA (1997, 1998), FCC (1997, 1998, 1999), FTC (1997, 1998, 1999), and OPM. (1997, 1998, 1999). Sum of components may not equal total due to independent rounding.

¹In 1998, the State Department developed a statistical method for estimating the energy consumption in the large number of foreign buildings it owns and leases. This method was subsequently applied to estimate FY 1991 energy consumption and is now used annually to assess progress. The FY 1991 foreign building estimates were combined with domestic building data for the fiscal years 1985 and 1990, since these are base years for performance goals.

Source : Federal Agency Annual Energy Management Data Reports

TABLE 4-B
FEDERAL NET ENERGY CONSUMPTION IN BUILDINGS AND FACILITIES
(In Billions of Btu, with Conversions to Millions of Barrels of Oil Equivalent [MBOE], and Petajoules [Joule x 10¹⁵])

CIVILIAN AGENCY	FY 1985	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	%CHANGE 85-99	%CHANGE 98-99
VA	24,552.0	24,380.1	24,733.0	24,620.0	25,077.2	25,213.4	25,075.4	26,172.3	26,062.0	26,216.9	26,134.8	6.4	-0.3
USPS	16,238.3	18,480.0	18,620.8	19,449.2	21,159.8	21,602.2	21,649.7	22,210.0	22,006.4	22,683.9	23,127.0	42.4	2.0
DOE	32,607.5	29,297.3	28,077.6	29,564.3	30,546.8	29,193.0	28,011.6	25,987.3	23,746.2	23,126.7	21,730.4	-33.4	-6.0
GSA	16,563.0	13,937.3	13,116.3	13,061.4	13,075.2	12,832.9	12,366.7	13,439.4	13,353.7	13,123.7	13,083.9	-21.0	-0.3
DOJ	6,112.0	4,863.8	5,894.3	3,869.2	6,245.8	6,143.9	6,303.9	7,490.6	8,003.7	7,783.0	8,047.1	31.7	3.4
NASA	3,095.7	3,450.1	3,375.6	3,335.8	3,250.4	3,262.6	3,466.3	3,730.4	3,875.4	3,941.4	3,847.8	24.3	-2.4
DOI	4,762.4	4,039.4	3,886.2	3,173.4	3,974.3	3,922.1	3,596.3	2,979.1	3,668.5	3,747.4	3,794.6	-20.3	1.3
DOT	4,534.6	3,750.4	3,297.6	3,918.0	3,886.6	3,903.0	3,898.8	3,948.8	3,857.7	3,679.3	3,722.6	-17.9	1.2
ST ¹	2,756.9	2,792.5	2,799.0	273.8	45.3	82.9	92.9	289.2	2,894.1	2,893.3	3,012.2	9.3	4.1
HHS	2,962.8	7,957.0	7,107.1	7,954.7	7,969.1	8,231.9	6,024.2	6,610.3	7,417.8	2,744.0	2,810.6	-5.1	2.4
USDA	2,096.3	2,363.0	2,342.4	2,151.6	2,234.8	2,164.5	2,083.1	2,261.3	1,996.0	2,111.1	1,901.8	-9.3	-9.9
TRSY	615.0	1,918.4	1,494.7	1,749.1	1,568.0	1,624.7	1,418.3	1,484.9	1,904.4	1,741.2	1,701.6	176.7	-2.3
DOL	2,153.0	2,137.1	2,044.1	2,063.7	2,145.8	2,158.3	2,028.8	2,153.9	2,153.9	2,190.2	1,697.9	-21.1	-22.5
EPA	772.3	747.0	822.4	839.7	894.1	943.4	1,021.1	1,023.3	1,011.5	1,022.9	1,170.1	51.5	14.4
TVA	402.4	427.8	426.6	425.6	439.8	664.0	748.5	728.4	665.6	658.4	650.8	61.7	-1.2
DOC	540.3	1,376.0	1,406.9	531.0	571.9	752.9	494.9	490.1	457.2	429.9	449.4	-16.8	4.5
HUD	116.9	140.3	132.2	123.1	116.2	113.5	105.9	115.4	109.3	103.1	106.3	-9.1	3.1
FCC	11.2	14.8	14.9	12.4	12.9	14.1	14.1	12.8	12.8	12.8	12.8	14.4	0.0
OTHER*	369.0	698.5	503.8	518.3	426.0	403.9	1,189.7	1,884.6	1,989.1	1,898.7	1,958.9	430.9	3.2
CIVILIAN AGENCIES TOTAL	121,288.4	122,799.3	120,127.9	117,664.1	123,672.5	123,258.6	119,621.9	123,044.5	125,219.3	120,107.8	118,960.5	-1.9	-1.0
DOD	349,076.7	321,101.6	286,885.7	295,719.8	279,726.5	262,661.5	247,166.9	235,688.1	227,070.0	220,567.6	217,958.2	-37.6	-1.2
ALL AGENCIES TOTAL	470,365.1	443,900.9	407,013.6	413,383.9	403,399.0	385,920.2	366,788.8	358,732.6	352,289.3	340,675.4	336,918.7	-28.4	-1.1
MBOE	80.7	76.2	69.9	71.0	69.3	66.3	63.0	61.6	60.5	58.5	57.8		
Petajoules	496.2	468.3	429.4	436.1	425.6	407.1	386.9	378.4	371.7	359.4	355.4		

DATA AS OF 10/26/00

*Other includes for certain years the CFTC, CIA, EEOC, FEMA, FTC, NARA, NSF, NRC, OPM, RRB, SSA, USIA, and FERC.

Note: This table uses a conversion factor for electricity of 3,412 Btu per kilowatt hour. Contains estimated data for the following agencies: FEMA (1997, 1998), FCC (1997, 1998, 1999), FTC (1997, 1998, 1999), and OPM. (1997, 1998, 1999). Sum of components may not equal total due to independent rounding.

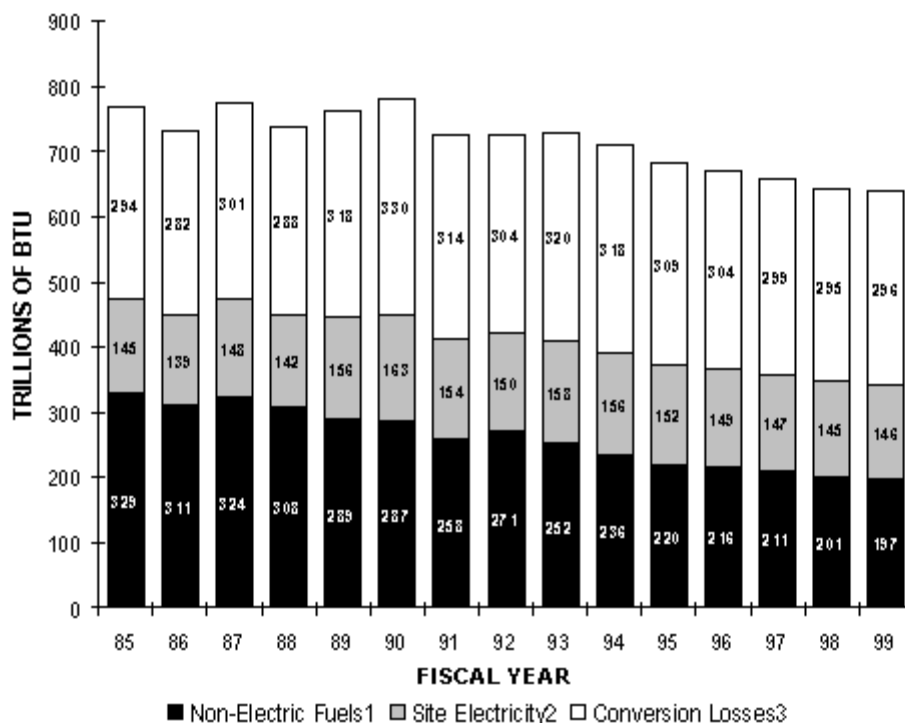
¹In 1998, the State Department developed a statistical method for estimating the energy consumption in the large number of foreign buildings it owns and leases. This method was subsequently applied to estimate FY 1991 energy consumption and is now used annually to assess progress. The FY 1991 foreign building estimates were combined with domestic building data for the fiscal years 1985 and 1990, since these are base years for performance goals.

Source : Federal Agency Annual Energy Management Data Reports

(119.2 trillion Btu), and 10.2 percent by fuel oil (34.5 trillion Btu). Coal, purchased steam, liquefied petroleum gas (LPG)/propane, and energy reported as “other” (comprised mainly of chilled water and renewable energy), account for the remaining 11.1 percent.

Figure 6 illustrates the proportion of energy consumption in buildings and facilities that is attributable to electricity for FY 1985 through FY 1999. The figure also breaks out the amount of Btu lost through the generation and transmission processes and amount of Btu delivered to the site. In FY 1999, electricity consumption, including energy used at the source of generation, accounted for approximately 69.1 percent (441,964.6 billion Btu) of the total primary Btu consumed in buildings and facilities (639,279.1 billion Btu; see Table 4-A). Of this amount, approximately 29.4 percent or 145.8 trillion Btu reached the site of use. The remaining 70.6 percent, 296.2 trillion Btu, was lost during the generation and transmission processes.

FIGURE 6
Consumption of Electricity and Other Fuels in Buildings/Facilities,
FY 1985 through FY 1999



¹Includes Fuel Oil, Natural Gas, LPG/Propane, Coal, Purchased Steam, and Other. Uses a conversion factor for steam of 1,390 Btu per pound (source conversion).

²Uses a conversion factor of 3,412 Btu per kilowatt hour. Amount of energy which reaches the site of use when generation and transmission losses are subtracted.

³Amount of energy lost through generation and transmission processes. When added to amount of energy reaching the point of use, the total equals amount of Btu consumed at the source. The source conversion factor is 10,346 Btu per kilowatt hour.

Source: Federal Agency Annual Energy Management Data Reports

Decreases in consumption relative to FY 1998 were seen in fuel oil (5.1 percent), natural gas (1.0 percent), LPG/propane (26.0 percent), and coal (6.3 percent). Increases from the previous year were seen in electricity (0.3 percent), purchased steam (1.9 percent) and in fuels reported under the category of “other” (52.5 percent).

The mix of fuels consumed by Government buildings has changed notably from FY 1985 through FY 1999. The actual consumption of electricity has remained fairly steady since FY 1985, with a increase of 0.3 percent in FY 1999 while square footage has declined 9.7 percent. However, the proportion of energy consumed in Federal buildings and facilities that is electricity has increased from 30.7 percent in FY 1985 to 43.3 percent in FY 1999. Over the same period, fuel oil use decreased from 22.7 percent of the total in FY 1985 to only 10.2 percent in FY 1999. The portion of the Federal buildings fuel mix comprised by natural gas has increased from 30.8 percent in FY 1985 to 35.4 percent in FY 1999. The use of coal as a fuel source, which accounted for 12.3 percent of the total energy consumed in FY 1985, has declined to 5.3 percent of the total in FY 1999. Contributing to this has been the practice of agencies, such as DOE, to purchase steam rather than generating their own in coal-fired plants.

As shown in Table 5, the consumption of petroleum-based fuels in buildings during FY 1999 decreased 66.8 percent compared to FY 1985 and 6.7 percent from FY 1998. Efforts by agencies to utilize natural gas as a cost-effective substitute for petroleum-based fuels in buildings, as well as conservation of fuel oil and LPG/propane in buildings contributed to these reductions. Petroleum fuel consumption in buildings during FY 1999 represented only 10.9 percent of all energy consumed in Federal buildings. Of this amount, 94.0 percent is attributed to fuel oil and the remaining 6.0 percent to LPG/propane.

The energy used in buildings in FY 1999 accounted for approximately 42.9 percent of the total Federal energy bill. Tables 6-A and 6-B show that the Federal Government spent approximately \$3,410.8 million for buildings energy during the fiscal year, a decrease in constant dollars of approximately \$124.4 million from FY 1998 expenditures. The combined cost of buildings energy in FY 1999 was \$10.12 per million Btu, down 2.4 percent from the combined cost of \$10.38 reported in FY 1998.

Figure 7 illustrates energy expenditures for buildings and facilities from FY 1985 through FY 1999. In constant 1999 dollars, Federal energy costs for buildings and facilities decreased 39.5 percent from \$5,642.2 million in FY 1985 to \$3,410.8 million in FY 1999. The combined cost for buildings energy in constant dollars in FY 1999 was \$10.12 per million Btu, down 15.6 percent from \$12.00 per million Btu in FY 1985.

FIGURE 7
Energy Costs in Buildings and Facilities
FY 1985 through 1999

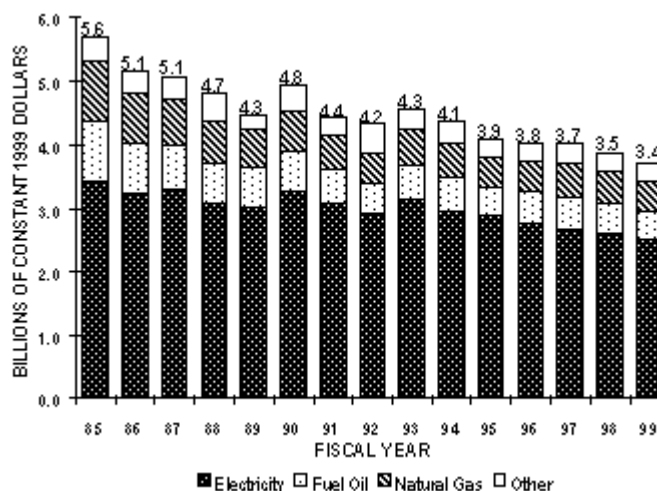


TABLE 5
PETROLEUM-BASED FUEL* CONSUMPTION IN BUILDINGS AND FACILITIES
(In Billions of Btu)

CIVILIAN AGENCY	FY 1985	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	%CHANGE 85-99	%CHANGE 98-99
DOD	96,817.3	69,030.1	59,451.5	65,654.1	55,585.9	50,285.7	42,939.0	42,861.7	35,214.4	32,354.5	30,506.7	-68.5	-5.7
ST ¹	817.8	817.8	817.8	0.0	0.0	0.0	0.0	21.8	706.0	706.0	1,098.0	34.3	55.5
VA	2,176.7	2,219.3	1,404.9	1,506.0	1,533.9	1,827.4	1,292.9	2,098.2	1,186.3	954.6	954.8	-56.1	0.0
USPS	1,673.2	1,502.2	1,219.4	1,195.8	988.8	983.7	813.9	595.2	819.0	1,139.4	821.7	-50.9	-27.9
DOT	2,376.9	1,524.1	1,308.4	1,426.0	854.0	1,001.6	911.7	709.2	670.5	816.8	823.9	-65.3	0.9
DOE	1,641.8	1,900.5	2,063.7	2,042.7	1,943.5	1,924.4	1,973.5	1,554.1	1,394.0	1,174.5	646.5	-60.6	-45.0
DOI	1,591.6	1,273.9	1,141.1	919.1	1,181.9	1,560.6	1,574.3	1,177.7	799.6	964.7	835.1	-47.5	-13.4
HHS	710.7	2,138.7	1,545.9	2,144.2	1,765.2	1,525.7	1,152.5	1,718.8	760.7	333.4	324.5	-54.3	-2.6
DOL	437.8	331.2	258.3	263.6	276.1	277.5	210.8	220.6	254.2	226.1	188.9	-56.8	-16.4
DOJ	381.7	371.6	503.7	383.8	250.8	234.8	182.8	234.3	134.9	103.1	115.0	-69.9	11.5
NASA	230.2	277.8	161.6	217.6	129.0	139.6	88.6	110.9	88.3	93.5	83.1	-63.9	-11.1
GSA	991.3	668.1	443.1	418.2	359.4	379.8	199.0	242.3	143.0	54.8	68.4	-93.1	24.8
CIA	0.0	0.0	0.0	0.0	0.0	0.0	49.6	87.9	84.6	60.2	53.6	0.0	-11.1
TRSY	22.5	281.3	127.7	84.2	190.5	160.8	116.6	116.2	57.0	44.8	43.3	92.9	-3.3
FEMA	56.7	72.3	59.1	66.9	67.6	49.1	49.1	49.1	49.1	49.1	30.6	-46.1	-37.6
EPA	16.8	5.9	6.4	17.6	13.9	26.8	43.4	51.8	26.1	9.6	20.0	19.0	107.2
USDA	414.2	260.0	291.3	242.9	255.6	236.3	244.1	242.5	272.2	270.6	114.1	-72.4	-57.8
DOC	130.3	77.6	13.1	9.8	23.8	52.4	10.8	33.4	9.3	8.7	6.1	-95.3	-30.1
TVA	4.2	3.2	0.1	1.3	2.7	3.5	3.9	4.1	0.0	3.0	2.9	-31.4	-2.3
FCC	1.7	1.9	1.0	1.3	1.3	1.3	1.3	1.7	1.7	1.7	1.7	0.8	0.0
Other**	19.4	11.4	0.0	0.3	0.0	0.0	0.0	8.2	11.8	8.9	3.5	-82.0	-60.7
TOTAL	110,512.9	82,768.8	70,817.9	76,595.5	65,423.9	60,671.0	51,857.6	52,139.7	42,682.9	39,378.1	36,742.2	-66.8	-6.7

DATA AS OF 10/26/00

*Petroleum-based fuels include fuel oil and LPG/propane.

**Other includes for certain years EEOC, NSF, SSA, and USIA.

Note: Contains estimated data for the following agencies: FEMA (1997, 1998), FCC (1997, 1998, 1999), FTC (1997, 1998, 1999), and OPM. (1997, 1998, 1999). Sum of components may not equal total due to independent rounding.

¹In 1998, the State Department developed a statistical method for estimating the energy consumption in the large number of foreign buildings it owns and leases. This method was subsequently applied to estimate FY 1991 energy consumption and is now used annually to assess progress. The FY 1991 foreign building estimates were combined with domestic building data for the fiscal years 1985 and 1990, since these are base years for performance goals.

Source: Federal Agency Annual Energy Management Data Reports

TABLE 6-A
DEFENSE AND CIVILIAN FEDERAL COSTS FOR BUILDINGS ENERGY IN FY 1999
(In Millions of Dollars)

	ELECTRICITY	FUEL OIL	NATURAL GAS	LPG/ PROPANE	COAL	PURCHASED STEAM	OTHER	TOTAL
DEFENSE	1,384.470	149.000	285.608	14.310	32.712	159.510	0.765	2,026.375
CIVILIAN	1,112.432	23.791	177.410	4.665	4.521	53.719	7.850	1,384.389
TOTAL	2,496.902	172.790	463.018	18.975	37.234	213.229	8.615	3,410.764

AVERAGE COST PER UNIT, BASED ON REPORTS FROM AGENCIES

ELECTRICITY	= 58.45 / MWH
FUEL OIL	= 0.69 / GALLON
NATURAL GAS	= 4.01 / THOUSAND CUBIC FEET
LPG/PROPANE	= 0.82 / GALLON
COAL	= 50.98 / SHORT TON
PURCHASED STEAM	= 13.52 / MILLION BTU
OTHER	= 5.67 / MILLION BTU

DATA AS OF 10/26/00

Note: Contains estimated data for the following agencies: FCC, FTC, and OPM.
Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports.

TABLE 6-B
CONSUMPTION AND COSTS OF FEDERAL BUILDINGS ENERGY
BY FUEL TYPE IN FY 1999, FY 1998, AND FY 1985
(Constant 1999 Dollars)

ENERGY TYPE	BILLIONS OF BTU	COST PER MMBTU	COST (IN MILLIONS OF DOLLARS)
FY 1999			
ELECTRICITY	145,755.2	17.1308	2,496.902
FUEL OIL	34,523.0	5.0051	172.790
NATURAL GAS	119,176.8	3.8851	463.018
LPG/PROPANE	2,219.3	8.5503	18.975
COAL	17,953.8	2.0739	37.234
PURCHASED STEAM	15,772.0	13.5194	213.229
OTHER	1,518.7	5.6729	8.615
TOTAL	336,918.7		3,410.764
AVERAGE COST PER MMBTU = \$10.123			
FY 1998			
ELECTRICITY	145,296.7	17.6552	2,565.244
FUEL OIL	36,380.2	5.2841	192.235
NATURAL GAS	120,371.4	4.0621	488.958
LPG/PROPANE	2,997.9	8.7866	26.338
COAL	19,162.8	2.0357	39.008
PURCHASED STEAM	15,470.7	14.1702	219.224
OTHER	995.7	4.1668	4.149
TOTAL	340,675.4		3,535.157
AVERAGE COST PER MMBTU = \$10.377			
FY 1985			
ELECTRICITY	144,581.5	23.6376	3,417.560
FUEL OIL	106,902.6	8.4149	899.577
NATURAL GAS	144,653.7	6.4941	939.391
LPG/PROPANE	3,610.2	9.7121	35.063
COAL	57,923.3	3.3034	191.340
PURCHASED STEAM	7,983.9	15.9461	127.312
OTHER	4,709.9	6.7771	31.920
TOTAL	470,365.1		5,642.163
AVERAGE COST PER MMBTU = \$11.996			

DATA AS OF 10/26/00

Note: FY 1998 contains estimated data for the following agencies: FEMA, FCC, FTC, and OPM;
FY 1999 contains estimated data for: FCC, FTC, and OPM.

This table uses a conversion factor for electricity of 3,412 Btu per kilowatt hour. Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

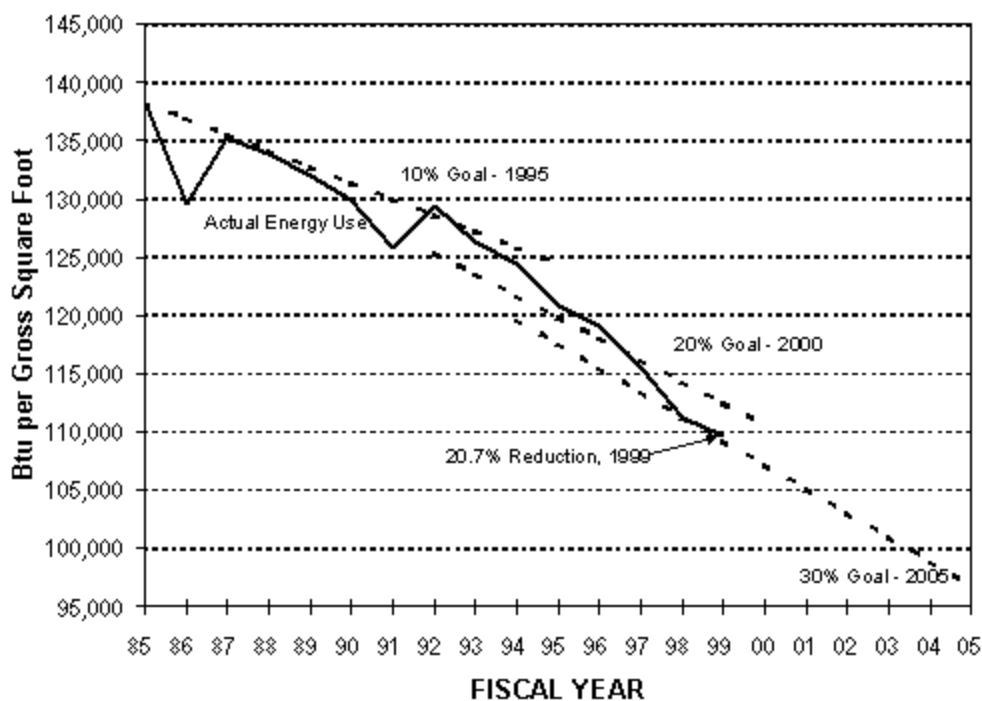
Electricity costs of \$2,496.9 million represent approximately 73.2 percent of total expenditures of \$3,410.8 million for buildings energy in FY 1999. Natural gas costs account for approximately 13.6 percent of the total, expenditures for fuel oil account for 5.1 percent, with the remaining 8.2 percent attributable to expenditures for LPG/propane, coal, purchased steam, and “other.”

In FY 1999, the cost of all energy used in Federal buildings was \$1.11 per gross square foot. Of the \$1.11 spent per square foot Government-wide, \$0.81 was spent for electricity, \$0.15 was spent for natural gas, \$0.06 was spent for fuel oil, and the remaining \$0.09 was spent for purchased steam, coal, LPG/propane, and other fuels.

B. Progress Toward the Mandated Goals for Buildings and Facilities

Both the magnitude of energy consumption and the potential for energy savings have prompted legislative and executive branch initiatives to achieve energy conservation in the Federal buildings sector.¹⁴ Federal Government progress toward the 10, 20, and 30 percent energy reduction goals of NECPA and Executive Order 12902 is illustrated in Figure 8. (Executive Order 13123 establishes a 35 percent reduction goal for 2010.) Overall, the Federal Government reduced its net energy consumption in buildings and facilities by 20.7 percent in FY 1999 compared to FY 1985 when measured in terms of British Thermal Units consumed per gross square foot (Btu/GSF) of floor area.

FIGURE 8
Progress Toward the Energy Reduction Goals for Federal Buildings and Facilities,
FY 1985 through FY 1999



¹⁴The legislative authorities for Federal agencies are detailed in Appendix A.

Table 7-A shows the FY 1999 performance of the individual agencies in net Btu/GSF compared to FY 1985. Net Btu reflects the amount of energy delivered to the point of use and is used to measure agency performance toward the mandated goals.

Table 7-B shows the performance of the agencies measured in terms of primary Btu/GSF. Primary Btu represents the average amount of energy required at the source of generation (primary energy) rather than the actual Btu delivered to the site. Primary Btu includes energy resources used to generate, process, and transport electricity and steam. Measured in terms of source energy, the Federal Government shows a reduction of 7.8 percent in FY 1999 compared to FY 1985. This large difference from the net Btu/GSF reduction of 20.7 percent reflects the significant declines in direct use of fossil fuels and the offsetting increases in the share of the fuel mix contributed by electricity.

Contributing to the overall reduction of 20.7 percent in net Btu/GSF were the percentage reductions greater than 20 percent made by the following eight agencies: the Departments of Agriculture, Commerce, Energy, Justice, Labor, Transportation, and National Aeronautics and Space Administration, and the Tennessee Valley Authority.

These agencies used a variety of strategies to reduce their energy consumption. Operations and maintenance (O&M) procedures continued to be emphasized as a major component in the effort to achieve the energy reduction goals. Improvements in energy efficiency were achieved through improved energy systems operations and both preventive maintenance and improved maintenance. O&M funding, used for the replacement of boilers, HVAC equipment, windows, and lighting systems, continued to benefit energy conservation.

In FY 1999, the implementation of many no-cost and low-cost energy conservation measures was continued, such as reducing lighting levels, lowering hot water temperatures, turning off unused equipment, and installing energy-efficient windows, insulation, weather stripping, and set-back thermometers.

Numerous energy-efficient building retrofits and energy conservation projects were undertaken to supplement the no-cost, low-cost measures. These initiatives can be categorized by lighting system replacement, HVAC equipment modernization, building envelope improvements, and other miscellaneous projects, such as installation of energy management control systems. Utility-sponsored demand side management programs were often pursued as supplemental sources of funding, as well as energy savings performance contract initiatives.

Other activities include energy awareness programs featuring energy awareness seminars, the identification of no-cost or low-cost measures, the designation of building energy monitors, publication of materials promoting energy efficiency, the procurement of energy-efficient goods and products, increased maintenance training, and increased engineering assistance.

TABLE 7-A
FEDERAL BUILDINGS AND FACILITIES NET ENERGY USE
PER GROSS SQUARE FOOT, FY 1985 AND FY 1999

	FISCAL YEAR 1985			FISCAL YEAR 1999			%CHANGE 1985-1999
	GSF (Thousands)	BTU (Billions)	BTU/GSF	GSF (Thousands)	BTU (Billions)	BTU/GSF	
VA	123,650.0	24,552.0	198,560	154,669.0	26,134.8	168,972	-14.9
USPS	189,400.0	16,238.3	85,736	329,062.6	23,127.0	70,281	-18.0
DOE	72,920.8	32,607.5	447,163	79,055.0	21,730.4	274,876	-38.5
GSA	196,341.4	16,563.0	84,358	186,788.1	13,083.9	70,047	-17.0
DOJ	20,768.8	6,112.0	294,289	45,959.1	8,047.1	175,092	-40.5
NASA	11,509.1	3,095.7	268,977	20,110.7	3,847.8	191,330	-28.9
DOI	54,154.4	4,762.4	87,940	51,192.7	3,794.6	74,124	-15.7
DOT	32,007.8	4,534.6	141,673	35,865.5	3,722.6	103,793	-26.7
ST ¹	44,674.4	2,756.9	61,711	52,469.5	3,012.2	57,409	-7.0
HHS	11,895.2	2,962.8	249,078	13,215.0	2,810.6	212,686	-14.6
USDA	24,709.9	2,096.3	84,837	28,916.6	1,901.8	65,767	-22.5
TRSY	5,776.9	615.0	106,463	11,843.6	1,701.6	143,672	34.9
DOL	18,268.3	2,153.0	117,852	18,582.5	1,697.9	91,372	-22.5
EPA	1,931.2	772.3	399,923	3,103.4	1,170.1	377,048	-5.7
TVA	4,886.6	402.4	82,357	10,230.8	650.8	63,608	-22.8
DOC	4,522.6	540.3	119,476	5,629.4	449.4	79,837	-33.2
HUD	1,432.0	116.9	81,668	1,432.0	106.3	74,235	-9.1
FCC	121.0	11.2	92,182	124.8	12.8	102,204	10.9
OTHER*	2,558.5	369.0	144,232	15,945.3	1,958.9	122,853	-14.8
CIVILIAN AGENCIES							
TOTAL	822,021.4	121,288.4	147,549	1,064,195.6	118,960.5	111,784	-24.2
DOD	2,578,984.0	349,076.7	135,354	2,007,714.4	217,958.2	108,560	-19.8
TOTAL	3,401,005.4	470,365.1	138,302	3,071,910.0	336,918.7	109,677	-20.7

DATA AS OF 10/26/00

*Other includes the Federal Trade Commission, Federal Emergency Management Agency, National Archives and Records Administration, National Science Foundation, Nuclear Regulatory Commission, Office of Personnel Management, Railroad Retirement Board, the U.S. Information Agency, and the Federal Energy Regulatory Commission.

Note: This table uses a conversion factor for electricity of 3,412 Btu per kilowatt hour.
Sum of components may not equal total due to independent rounding.

¹In 1998, the State Department developed a statistical method for estimating the energy consumption in the large number of foreign buildings it owns and leases. This method was subsequently applied to estimate FY 1991 energy consumption and is now used annually to assess progress. The FY 1991 foreign building estimates were combined with domestic building data for the fiscal years 1985 and 1990, since these are base years for performance goals.

Source: Federal Agency Annual Energy Management Data Reports

TABLE 7-B
FEDERAL BUILDINGS AND FACILITIES PRIMARY ENERGY USE
PER GROSS SQUARE FOOT, FY 1985 AND FY 1999

	FISCAL YEAR 1985			FISCAL YEAR 1999			%CHANGE 1985-1999
	GSF (Thousands)	BTU (Billions)	BTU/GSF	GSF (Thousands)	BTU (Billions)	BTU/GSF	
USPS	189,400.0	35,915.2	189,626	329,062.6	52,058.2	158,202	-16.6
VA	123,650.0	39,673.2	320,851	154,669.0	45,731.8	295,675	-7.8
DOE	72,920.8	53,246.1	730,191	79,055.0	43,445.8	549,564	-24.7
GSA	196,341.4	37,553.7	191,267	186,788.1	31,527.5	168,788	-11.8
DOJ	20,768.8	8,531.9	410,805	45,959.1	14,696.6	319,775	-22.2
NASA	11,509.1	6,257.3	543,679	20,110.7	8,836.0	439,366	-19.2
DOT	32,007.8	7,811.6	244,053	35,865.5	7,779.2	216,900	-11.1
DOI	54,154.4	7,879.7	145,504	51,192.7	6,949.6	135,754	-6.7
ST ¹	44,674.4	6,209.8	139,002	52,469.5	6,173.0	117,649	-15.4
HHS	11,895.2	4,581.3	385,135	13,215.0	5,076.6	384,154	-0.3
USDA	24,709.9	4,008.4	162,218	28,916.6	4,045.5	139,903	-13.8
TRSY	5,776.9	1,334.9	231,071	11,843.6	4,011.4	338,694	46.6
DOL	18,268.3	3,455.8	189,167	18,582.5	2,986.9	160,736	-15.0
EPA	1,931.2	1,488.8	770,909	3,103.4	2,130.1	686,382	-11.0
TVA	4,886.6	1,180.5	241,575	10,230.8	1,959.6	191,537	-20.7
DOC	4,522.6	1,092.9	241,648	5,629.4	1,125.3	199,900	-17.3
HUD	1,432.0	315.2	220,090	1,432.0	286.8	200,300	-9.0
FCC	121.0	26.7	220,860	124.8	28.8	230,617	4.4
OTHER*	2,558.5	859.4	335,891	15,945.3	4,754.9	298,198	-11.2
CIVILIAN AGENCIES							
TOTAL	822,021.4	221,502.9	269,461	1,064,195.6	243,603.5	228,909	-15.0
DOD	2,578,984.0	545,800.0	211,634	2,007,714.4	395,675.6	197,078	-6.9
TOTAL	3,401,005.4	767,302.9	225,611	3,071,910.0	639,279.1	208,105	-7.8

DATA AS OF 10/26/00

*Other includes the Federal Trade Commission, Federal Emergency Management Agency, National Archives and Records Administration, National Science Foundation, Nuclear Regulatory Commission, Office of Personnel Management, Railroad Retirement Board, the U.S. Information Agency, and the Federal Energy Regulatory Commission.

Note: This table uses a conversion factor for electricity of 10,346 Btu per kilowatt hour and 1,390 Btu per pound of steam. Sum of components may not equal total due to independent rounding.

¹In 1998, the State Department developed a statistical method for estimating the energy consumption in the large number of foreign buildings it owns and leases. This method was subsequently applied to estimate FY 1991 energy consumption and is now used annually to assess progress. The FY 1991 foreign building estimates were combined with domestic building data for the fiscal years 1985 and 1990, since these are base years for performance goals.

Source: Federal Agency Annual Energy Management Data Reports

A number of agencies began submitting energy data to DOE starting in FY 1989 in compliance with NECPA as amended by the Federal Energy Management Improvement Act of 1988 (Pub. L. 100-615). Among these agencies are the Department of State, the Office of Personnel Management, and the Federal Energy Regulatory Commission. These three agencies submitted historical energy data back to FY 1985.

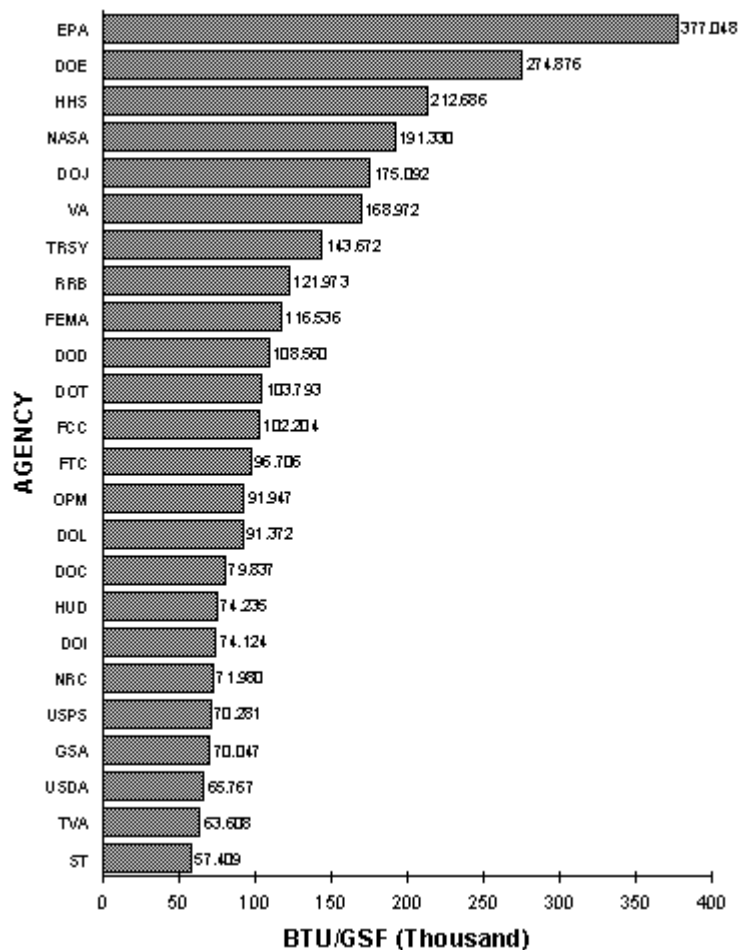
For FY 1990 and forward, Federal Energy Regulatory Commission energy consumption is reported as part of DOE and is therefore grouped under the category of “Other.” Other agencies grouped under the category of “Other” in the tables had no buildings data to report for FY 1985. These agencies include the Federal Trade Commission, the National Archives and Records Administration, the Nuclear Regulatory Commission, the Railroad Retirement Board, and the U.S. Information Agency. The National Science Foundation, Federal Emergency Management Agency, and Office of Personnel Management also are grouped under this category due to lack of reporting in more recent years.

In FY 1999, GSA continued to delegate building management authority to agencies that occupy buildings owned and operated by GSA. As a result, several agencies reported increased gross square footage and energy consumption relative to FY 1985, while GSA reported decreases in these categories during the same period. The GSA delegation accounts for the significant inter-year changes in energy consumption reported by various individual agencies. Two agencies, the Department of Health and Human Services and the Department of Commerce, adjusted their baseline year consumption and GSF figures during FY 1988 to reflect GSA delegations. DOC added the Jeffersonville Federal Center to its data reports, which greatly increased its gross square footage. In addition, three Commerce Bureaus, the Bureau of Economic Affairs, the National Technical Information Service, and the Patent and Trademark Office, all became eligible for reporting in FY 1989 as a result of leasing delegation.

The Treasury Department’s large increase in buildings energy consumption since FY 1985, is a result of the addition of the Internal Revenue Service delegated buildings to the Department’s building inventory. Also contributing to the Treasury’s increase was the additions, in FY 1989, of the Office of Thrift Supervision’s square footage and the GSA delegation of building management authority for the Financial Management Service. The energy consumption and square footage for these delegated buildings were included in GSA’s FY 1985 reports.

Figure 9 illustrates the range of energy intensity in agency buildings measured in terms of Btu/GSF. High rates of energy intensity at the EPA, HHS, and DOE reflect the special requirements of their laboratory and research facilities. At DOE, if more than 80 percent of a facility's metered energy is dedicated to process operations, then the entire facility's energy is excluded from the buildings category, according to how DOE defines its buildings and facilities. The Interior Department's relatively low Btu/GSF results from the lack of energy intensive activities (i.e., laboratories, hospitals, etc.) in space under its control. The wide range of rates of Btu/GSF among different agencies is a result of the varying missions of the agencies as well as their varying criteria for excluding energy intensive facilities.

FIGURE 9
Range of Energy Intensity (Btu/GSF) in Buildings and Facilities by Agency in 1999



C. ENERGY STAR® Program Participation

The Federal ENERGY STAR® Buildings Program Memorandum of Understanding (MOU) was signed by Mary Nichols, Environmental Protection Agency (EPA), and Christine Ervin, former Assistant Secretary for Energy Efficiency and Renewable Energy, Department of Energy, in March 1997.

During FY 1999, several Federal agencies took actions regarding both the Federal ENERGY STAR® Buildings and the Green Lights programs:

- Department of Defense—The Norfolk District, Army Corps of Engineers, in a joint demonstration with DOD and the EPA, developed a military housing design to achieve an “EPA 5 Star Energy Efficiency Rating” for 135 family housing units at Fort Lee, Virginia.

- Department of the Interior—In conjunction with EPA and DOE, DOI prepared a MOU to participate in the Federal ENERGY STAR® Program partnerships. This MOU was forwarded to the Interior’s Assistant Secretary for Policy, Management and Budget.
- Department of State—State has committed to meeting ENERGY STAR® Building Program goals for all new overseas construction.
- Department of Transportation—The United States Coast Guard is actively engaged in the development of eight ENERGY STAR® buildings that will become showcase buildings upon project completion.
- Environmental Protection Agency—Several EPA facility construction projects demonstrate ENERGY STAR® Buildings technologies and concepts including the New Headquarters Buildings (Washington, DC), the New Consolidated RTP Facility (Research Triangle Park, NC), the Region IV Science and Ecosystems Support Laboratory (Athens, GA), Region IV Office (Atlanta, GA), Region III Office (Philadelphia, PA), Region VII Central Regional Laboratory (Kansas City, KS), National Vehicle and Fuel Emissions Laboratory (Ann Arbor, MI), and the Fort Meade Environmental Science Center (Fort Meade, MD).
- Department of Health and Human Services—The HHS Energy Officer and the operating division energy coordinators met with EPA to discuss the Federal ENERGY STAR® Buildings program. Each HHS operating division will sign a MOU which will be forwarded to operating division heads with a cover letter encouraging participation from the Office of the Secretary’s Assistant Secretary for Management and Budget.
- National Aeronautics and Space Administration—Both Goddard Space Flight Center and the Santa Susana Field Laboratory participate in the Green Lights program.
- Tennessee Valley Authority (TVA)—TVA is in the process of becoming a partner in the Federal ENERGY STAR® Buildings program. As a member of the Green Lights program, TVA developed the SWAP program to eliminate the cycle time for lighting upgrades and to reduce survey and design cost as part of these efforts. SWAP II, which will evaluate the implementation of lighting controls as a first step in the reduction of energy, will be initiated in FY 1998.
- United States Postal Service—Signed MOU with EPA to participate in the Federal ENERGY STAR® Buildings program.

D. Federal Building Energy Performance Standards

Federal agencies are subject to the provisions of 10 CFR part 435, subpart A, which set forth interim building energy performance standards for new Federal buildings. Standards for new Federal buildings are issued under the Energy Conservation Standards in New Buildings Act of 1976, as amended, 42 U.S.C. 6831 *et seq.*, and under Title V, subtitle H, of the Energy Security Act, 42 U.S.C. § 8286 and 8286a. On August 6, 1996, the Department of Energy issued a proposed rule in the *Federal Register*, 61 FR 40882, to revise the 1989 interim rule, 10 CFR part 435, which established energy efficiency voluntary performance standards for design of new Federal commercial and multi-family high-rise residential buildings.

EPACT mandates that new Federal buildings must contain energy saving and renewable energy specifications that meet or exceed the energy saving and renewable energy specifications of the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)/ Illuminating Engineering Society of North America (IES) Standard 90.1-1989 and the Council of American Building Officials Model Energy Codes (MEC) 1992.

Furthermore, Executive Order 12902, which was designed to assist agencies in meeting or exceeding the Federal energy and water efficiency provisions contained in EPACT, requires each agency involved in the construction of a new facility that will be either owned by or leased to the Government to:

- (1) design and construct such facility to minimize the life-cycle cost of the facility by utilizing energy efficiency, water conservation, or solar or other renewable energy technologies;
- (2) ensure that the design and construction of facilities meet or exceed the energy performance standards applicable to Federal residential or commercial buildings as set forth in 10 CFR 435, local building standards, or a Btu-per-gross-square-foot ceiling as determined by the Task Force within 120 days of the date of this order, whichever will result in a lower life-cycle cost over the life of the facility;
- (3) establish and implement, within 270 days of the date of this order, a facility commissioning program that will ensure that the construction of such facilities meets the requirements outlined in this section before the facility is accepted into the Federal facility inventory; and
- (4) utilize passive solar design and adopt active solar technologies, where cost-effective.

The Department of Energy has endeavored to fulfill these requirements by developing common energy conservation standards for all new Federal buildings and by issuing life-cycle costing procedures for use by Federal agencies in the assessment of energy conserving investments for existing buildings.

In response to the Executive Order 12902 requirement for Federal agencies to establish and implement a facility commissioning program, DOE formed the New Space Working Group under the Federal Interagency Energy Management Task Force. The Working Group, in conjunction with GSA and other Federal agencies, drafted a *Building Commissioning Guide*

which has been distributed to agencies for final comment. The *Guide* is designed to help all parties involved in the planning, design, construction, acceptance, and post-acceptance phases work together to produce a building that operates according to design intent and provides occupant comfort and energy savings. The draft *Guide* will be posted on the Federal Energy Management Program's Internet Web site at www.eren.doe.gov/femp for use during the review process.

A proposed rule, *Energy Code for New Federal Commercial and Multi-Family High Rise Residential Buildings*, revises the interim Federal standards to conform generally with the codified version of ASHRAE Standard 90.1-1989 and incorporates changes in the areas of lighting, mechanical ventilation, motors, building envelope, and fenestration rating procedures, and test procedures for heating and cooling equipment. Since Standard 90.1-1989 is written as a standard of professional practice, it cannot be directly adopted as a building code. DOE's New Space Working Group expressed concern that the *Energy Code* be concise as possible, publishing the minimal exceptions to the commercial standard, rather than publishing an entire new energy code. Using one standard would allow the architect/engineer community to focus on designing energy saving elements, rather than on implementing an unique Federal standard. The Working Group also recommended that an electronic version of the codified rule be placed on the Internet. The final version of the *Energy Code* is expected to be published by DOE in 2000.

A separate proposed rule for new Federal residential buildings was issued by the Department of Energy in the *Federal Register* in May 1997. The proposed rule, *Energy Code for New Federal Residential Buildings*, uses the Model Energy Code (MEC) format and contains performance standards from the current Federal residential standard, the MEC, and the codified version of ASHRAE Standard 90.2-1993 that are economically justified and technologically feasible.

DOE has also worked closely with HUD in coordinating the technical factors and data used to develop HUD's Manufactured Housing Standards and has committed to work closely with all Federal agencies to coordinate and upgrade the standards applied by these agencies to non-Federal buildings.

DOE is concurrently working on a model commissioning plan based on a GSA plan for a Federal courthouse in Portland, Oregon. This model will be more detailed than the *Building Commissioning Guide* and will include forms, model plans, training, and acceptance procedures for the building.

III. ENERGY INTENSIVE OPERATIONS IN FEDERAL FACILITIES

A. Energy Consumption and Costs for Energy Intensive Operations

NECPA, as amended, 42 U.S.C. § 8253, allows agencies to exclude from the buildings goal, facilities which house energy intensive activities. The energy consumed in these facilities is reported under the category of excluded/process energy. The reporting of energy used in excluded buildings assures that total Federal energy consumption is monitored.

The designation of excluded buildings is at the discretion of each agency. Currently, 15 agencies are excluding specific facilities from the NECPA goal: the Departments of Agriculture, Commerce, Defense, Energy, Health and Human Services, Justice, State, Transportation, and the Treasury, the General Services Administration, the National Aeronautics and Space Administration, the National Archives and Records Administration, the Social Security Administration, the Tennessee Valley Authority, and the U.S. Information Agency. Lists of the excluded buildings that have been identified by the agencies are included in Appendix D.

Table 8 shows that fuels consumed by excluded/process energy have increased 56.0 percent compared to FY 1985 and decreased 2.5 percent from FY 1998. During FY 1999, the Department of Defense consumed 32.9 trillion Btu of excluded/process energy, 48.2 percent of all excluded/process energy used by the Federal Government.

Some of the fluctuations in consumption of excluded/process energy resulted from agencies changing data collection and reporting procedures. The Social Security Administration began reporting its energy separately from the Department of Health and Human Services in FY 1996 and has elected to exclude check processing facilities as energy intensive. In FY 1994, the Tennessee Valley Authority began reporting electricity used for certain processes of its generating plants. The Department of Justice also commenced reporting energy consumption in its excluded buildings during FY 1994. Increases in consumption of excluded/process energy compared to FY 1985 is also partially attributable to DOD's reallocation, beginning in the FY 1988 reporting year, of energy previously reported in the buildings category to the process category. Also contributing to this increase was the Treasury Department's initial reporting of process energy in FY 1991. Treasury neither reported process energy prior to 1991 nor revised its building energy consumption prior to 1990 to exclude process energy. NASA began reporting process energy in FY 1989 and has revised its prior year data. As a result of the prioritization survey required by Executive Order 12902, NASA redesignated the entire Dryden Flight Research Center, virtually all of the White Sands Test Facility, and many individual facilities at the Goddard Space Flight Center and the Langley Research Center as non-exempt facilities in FY 1996. NASA also redesignated the entire Michoud Assembly Facility as an industrial facility. USIA also began reporting energy under this category in FY 1989. USIA has not reported any process energy consumption for any prior years. GSA began reporting energy in excluded buildings in FY 1990 and has backed out this energy consumption from its FY 1985 buildings data. The Departments of Agriculture and Commerce both began excluding buildings where energy intensive activities occur in FY 1992. USDA revised all of its prior year buildings data back to FY 1985 to reflect the exclusion of the Agricultural Research Service. The Commerce

TABLE 8
FEDERAL NET ENERGY CONSUMPTION IN EXCLUDED BUILDINGS/PROCESS OPERATIONS
(In Billions of Btu, with Conversions to Millions of Barrels of Oil Equivalent [MBOE], and Petajoules [Joule x 10¹⁵])

CIVILIAN AGENCY	FY 1985	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	%CHANGE 85-99	%CHANGE 98-99
DOE	16,038.0	11,649.9	11,541.3	12,657.8	10,900.5	11,000.3	17,236.2	16,876.6	8,209.1	6,367.8	7,188.9	-55.2	12.9
NASA	5,759.6	7,135.0	7,215.7	7,327.6	7,310.3	7,590.9	7,172.0	6,210.8	6,482.8	6,347.4	6,158.5	6.9	-3.0
DOT	2,970.7	3,064.0	3,323.0	4,406.8	4,703.8	2,952.5	2,559.8	3,392.5	2,920.2	4,685.6	5,915.0	99.1	26.2
HHS	2,617.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4,209.1	3,778.0	44.3	-10.2
USDA	1,942.8	2,204.2	2,133.3	1,966.3	2,166.9	2,119.3	2,824.0	2,140.8	2,221.6	2,416.5	2,589.0	33.3	7.1
USPS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,974.4	2,026.2	2,063.3	0.0	1.8
TVA	1,871.0	1,701.0	1,661.9	1,546.5	1,354.1	1,390.6	1,317.1	1,235.6	1,251.8	1,208.4	1,436.1	-23.2	18.8
DOC	938.6	0.0	0.0	976.6	770.8	1,110.2	1,627.4	1,823.0	1,335.2	1,332.0	1,400.4	49.2	5.1
GSA	623.6	160.6	746.2	677.6	994.6	1,060.2	1,213.8	961.0	890.7	849.2	1,150.8	84.5	35.5
USIA	0.0	1,406.9	850.6	828.5	796.8	861.1	878.2	936.2	1,092.2	1,020.4	951.4	0.0	-6.8
DOJ	0.0	0.0	0.0	0.0	0.0	668.4	707.8	944.1	846.9	850.7	862.8	0.0	1.4
TRSY	0.0	0.0	1,026.8	814.1	923.7	771.8	941.0	928.3	1,131.8	996.5	776.2	0.0	-22.1
NARA	0.0	0.0	0.0	0.0	274.7	610.7	792.2	562.9	572.7	591.8	582.1	0.0	-1.6
ST	0.0	0.0	0.0	0.0	337.4	339.4	344.4	364.1	339.1	324.2	315.5	0.0	-2.7
SSA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	215.5	204.7	211.4	199.1	0.0	-5.8
CIVILIAN AGENCIES TOTAL	32,928.8	27,512.3	28,695.9	31,395.8	30,731.0	30,676.5	37,823.1	36,810.1	29,694.4	33,437.3	35,367.3	7.4	5.8
DOD	10,857.2	39,209.1	56,372.1	67,913.1	41,159.3	39,781.4	37,962.6	37,260.1	35,702.3	36,588.4	32,919.0	203.2	-10.0
ALL AGENCIES TOTAL	43,786.0	66,721.4	85,068.0	99,308.9	71,890.4	70,457.9	75,785.7	74,070.1	65,396.7	70,025.7	68,286.3	56.0	-2.5
MBOE	7.5	11.5	14.6	17.0	12.3	12.1	13.0	12.7	11.2	12.0	11.7		
Petajoules	46.2	70.4	89.7	104.8	75.8	74.3	80.0	78.1	69.0	73.9	72.0		

DATA AS OF 10/26/00

Note: This table uses a conversion factor for electricity of 3,412 Btu per kilowatt hour.

Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

Department revised its FY 1985 base year data only to reflect the exclusion of its energy intense facilities. The State Department and NARA began reporting excluded/process energy in FY 1993 and have not revised data for any prior years. The Justice Department commenced reporting of excluded buildings in FY 1994 and has not revised data for any prior years. The U.S. Postal Service began reporting energy consumption under this category in FY 1997 with no revisions to prior years. In FY 1999, HHS began reporting National Institutes of Health facilities under this category. HHS revised its FY 1985 baseline data to reflect this change and provided aggregated energy consumption information, not by energy type, for the intervening years. Therefore, the intervening years are not reflected in Table 8 and are instead included in HHS totals for standard buildings and facilities.

Energy used in energy intensive operations accounts for approximately 6.7 percent of the total 1.01 quads used by the Federal Government. Electricity constitutes 56.7 percent of the energy used in energy intensive operations, 26.2 percent is accounted for by natural gas, 4.8 percent by coal, and 9.2 percent by fuel oil. Small amounts of purchased steam, liquefied petroleum gas (LPG)/propane, and “other” energy account for the remaining 3.2 percent.

The energy used in energy intensive operations in FY 1999 accounted for approximately 8.0 percent of the total Federal energy bill. Table 9 shows that the Federal Government spent approximately \$639.7 million for excluded/process energy during the fiscal year. The combined cost of excluded/process energy in FY 1999 was \$9.37 per million Btu, down 1.8 percent from the combined cost of \$9.54 reported in FY 1998 (see Appendix C).

TABLE 9
DEFENSE AND CIVILIAN FEDERAL COSTS FOR EXCLUDED BUILDINGS/
PROCESS ENERGY IN FY 1999
(In Millions of Dollars)

	ELECTRICITY	FUEL OIL	NATURAL GAS	LPG/ PROPANE	COAL	PURCHASED STEAM	OTHER	TOTAL
DEFENSE ¹	173.334	13.514	30.835	0.523	5.464	3.905	0.005	227.580
CIVILIAN ²	362.427	6.133	27.836	0.278	0.327	12.774	2.379	412.155
TOTAL	535.762	19.647	58.671	0.800	5.791	16.679	2.384	639.735

AVERAGE COST PER UNIT, BASED ON REPORTS FROM AGENCIES

ELECTRICITY	=	47.25 / MWH
FUEL OIL	=	0.43 / GALLON
NATURAL GAS	=	3.38 / THOUSAND CUBIC FEET
LPG/PROPANE	=	0.56 / GALLON
COAL	=	43.85 / SHORT TON
PURCHASED STEAM	=	8.60 / MILLION BTU
OTHER	=	25.28 / MILLION BTU

DATA AS OF 10/26/00

¹Includes DOD costs for process and cold iron energy.

²Includes DOE costs for metered process energy and energy costs for buildings excluded from performance measurement by DOC, DOJ, DOT, GSA, HHS, NASA, NARA, SSA, STATE, TRSY, TVA, USDA, and USIA.

Note: Sum of components may not equal total due to independent rounding.

Source: Annual energy cost data submitted to DOE by Federal agencies.

B. Statutory Background and Progress Toward Goals for Industrial Facilities

Under section 543(a)(2) of NECPA, as amended by EPACT, 42 U.S.C. § 8253, buildings that house energy-intensive activities may be excluded from NECPA's performance goal for buildings. These buildings are listed in Appendix D. Most energy used in excluded buildings is process energy. Process energy is consumed in industrial operations, certain R&D activities, and in electronic-intensive facilities.

Executive Order 12902 expanded the scope of Federal energy management activities beyond the NECPA mandates by establishing goals for industrial operations. It required industrial facilities to increase in energy efficiency by at least 20 percent by 2005 as compared to 1990. Section 203 of Executive Order 13123 further expands this goal by requiring each agency to reduce energy consumption per square foot, per unit of production, or per other unit as applicable by 20 percent by 2005 and 25 percent by 2010 relative to 1990. This goal covers laboratory and other energy-intensive facilities in addition to industrial facilities. Measures undertaken to achieve this goal must be life-cycle cost-effective, and agencies are also directed to implement all cost-effective water conservation projects.

During FY 1999, the Energy Intensive Facilities Working Group worked to produce a guidance document entitled *Guidelines: Executive Order 13123, Section 203 Performance Goals for Industrial, Laboratory, Research, and Other Energy-Intensive Facilities*. The document was reviewed and approved by the Interagency Energy Management Task Force and issued in January 2000. The guidelines fulfill two requirements under the Executive Order. These are that the Secretary of Energy shall:

- Issue guidelines to assist agencies in measuring energy per square foot, per unit of production, or other applicable unit in industrial, laboratory, research, and other energy-intensive facilities (Section 502(a)); and
- Develop guidance to assist agencies in calculating appropriate energy baselines for previously exempt facilities and facilities occupied after 1990 in order to measure progress toward goals (Section 502(c)).

The guidance presented three options for measuring performance. These are: a rate-based measure of annual energy consumed per number of production units; a rate-based measure of annual energy consumed per number of other applicable units (for example, number of experiments, labor hours, customers served); and, Btu per gross square foot. The guidance provides advice on which measurement option is appropriate, depending on agency-specific factors.

The guidance also advises agencies on the proper manner of calculating appropriate energy baselines for previously exempt buildings and facilities. The Executive Order contains strict criteria for exemption that will mean agencies having to re-examine previously exempt buildings and possibly reassign them to one of the goal categories.

The Department of Defense excludes two types of energy from the NECPA performance goal: process energy and “cold iron” energy. Process energy is used in facilities that perform production or industrial functions. “Cold iron” energy is used to supply power to Navy ships docked in port. Both types of energy are included in this report under the category of excluded/process.

The Department of Energy reports its use of metered energy in extensive experimental research and production processes under excluded/process energy. The metered process energy used by DOE includes energy consumed in: production nuclear reactors, industrial-type operations for weapons and nuclear fuel production, and research and development facilities such as experimental nuclear reactors and linear accelerators. Excluded/process energy totaled almost 7.2 trillion Btu in FY 1999, which represents 23.7 percent of all energy consumed by DOE. The use of excluded process energy by DOE in FY 1999 was 55.2 percent less than in FY 1985, and 12.9 percent more than FY 1998. The primary contributor to the substantial drop beginning in FY 1997 was the sale by DOE of the Naval Petroleum Reserve, California, and subsequent decreases in natural gas consumption.

NASA excludes from the NECPA performance goal facilities which fall under its definition of mission-variable facilities. These highly specialized, energy-intensive facilities house space science experimental and testing activities, as well as some industrial operations. Examples of these facilities include wind tunnels driven by multi-thousand horsepower electric motors, launch facilities, space simulation chambers, space communication facilities, and research analysis centers. The Michoud Assembly Facility (MAF), which manufactures the Space Shuttle external tank, is the only NASA facility subject to the Executive Order goal for industrial facilities. MAF selected billion Btu (BBtu) per external tank as its industrial energy metric. In the FY 1990 baseline year, MAF total energy consumption was 925.8 BBtu at a production rate of 4.6 external tanks per year, or 201.3 BBtu/external tank. In FY 1999, MAF total energy consumption was 996.5 BBtu at a production rate of 7 external tanks per year, or 142.4 BBtu/external tank. This represents a 29.3 percent reduction in energy consumption per external tank produced.

The Department of Commerce excludes buildings operated by three of its agencies: the National Institute of Standards and Technology (NIST), the National Oceanic and Atmospheric Administration (NOAA), and the Bureau of the Census. NIST installations have been excluded because they are comprised of general purpose and special laboratories that require constant environmental space control and base electrical loads for scientific equipment and computer systems. NOAA Weather Service facilities operate 24 hours a day and consist of radar towers, computers, special gauges, meters and other sophisticated equipment. Marine Fisheries and Laboratories conduct marine biology research and utilize refrigerators, freezers, incubators, coolers, seawater pumps, and compressors that operate 24 hours a day. The Bureau of Census Charlotte Computer Center is a leased facility and is used solely as a computer center. The building is operated 24 hours a day.

Within the Department of Transportation, the Federal Aviation Administration excludes all buildings involved in implementing the National Airspace System Plan. These buildings house energy-intensive electronic equipment with the associated HVAC requirements to maintain an environment for reliable equipment operation.

The U.S. Information Agency designates domestic and overseas Voice of America Relay Stations as energy-intensive facilities and reports this consumption as process energy excluded from the NECPA performance goal.

The GSA excludes from the NECPA performance goal those buildings and facilities where energy usage is skewed significantly due to reasons such as: buildings entering or leaving the inventory during the year; buildings down-scaled operationally to prepare for disposal; buildings undergoing major renovation and/or major asbestos removal; or buildings functions like that of outside parking garages which consume essentially only lighting energy, yet are classed as buildings. GSA's excluded buildings, due to these factors, could distort GSA's actual progress toward meeting the energy reduction goal.

Energy reported by the Treasury Department under the category of excluded/process energy is comprised mainly of industrial energy consumption by the Bureau of Engraving and Printing and the Mint.

The State Department excludes unique, special-use facilities with special security and operational requirements including the President's guest house, a computer facility, the International Chancery Center, and the Main State Facility.

NARA designates all 12 of its facilities as energy intensive because of stringent records storage requirements which demand that documents and records be maintained in a controlled environment 24 hours per day, 365 days per year.

The Department of Justice excludes the Justice Data Center in Washington, DC, a 24-hour-a-day energy intensive facility and five installations operated by the Federal Bureau of Investigation which operate 24 hours per day. These facilities have limited conservation measures available. Also exempted by the Justice Department are Immigration and Naturalization Service repeater stations located nationwide that house equipment operations only.

The Social Security Administration, which began reporting energy consumption this year as an independent agency, has designated its National Computer Center as an energy intensive facility. The Center contains SSA's main database and operates 24 hours per day and 365 days per year.

Since 1985, the Postal Service has deployed energy intensive automated equipment which has improved the efficiency of mail operations. Surveys indicate that this equipment deployment has increased process energy usage by 8.9 percent in FY 1999. The Postal Service energy consumption reported under this category reflects process energy consumed by mail processing equipment. This consumption has been factored out of energy consumption of Postal Service non-excluded buildings in order to provide a better measure of their energy efficiency status.

Beginning in FY 1999, the Department of Health and Human Services reported the facilities controlled by the National Institutes of Health under energy-intensive category. HHS expects that a large portion of its entire inventory will eventually be subject to the goals established by Section 203 of Executive Order 13123 for industrial, laboratory, and other energy-intensive facilities.

IV. ENERGY MANAGEMENT IN VEHICLES AND EQUIPMENT

A. Energy Consumption and Costs for Vehicles and Equipment

Vehicle and equipment energy consists of energy used by equipment ranging in size and function from aircraft carriers to forklifts. It includes aircraft and naval fuels, automotive fuels consumed by Federally-owned and leased vehicles and privately-owned vehicles used for official business, and the energy used in Federal construction.

Table 10 shows that in FY 1999, the Federal Government used approximately 607.5 trillion Btu of energy for vehicles and equipment, a decrease of 35.0 percent relative to FY 1985. DOD's vehicle and equipment energy consumption decreased 37.2 percent from FY 1985, while the civilian agencies increased consumption by 9.5 percent. Overall, vehicle and equipment consumption decreased 3.2 percent from FY 1998. Federal energy consumption in vehicles and equipment is at its lowest level since Federal agencies began reporting consumption in 1975. This is mainly attributable to decreased operations by the Department of Defense.

Jet fuel consumption accounted for 73.2 percent of all vehicle and equipment energy in FY 1999. In FY 1999 compared to the previous year, jet fuel consumption decreased 0.2 percent from 445.5 trillion Btu to 444.7 trillion Btu.

Agencies have taken many tangible steps to keep the use of vehicle fuels to a minimum. For example, USPS continues to modernize its fleet, adding diesel delivery vans and long-life vehicles to its inventory, both of which are more fuel efficient than the older vehicles they replaced. DOD continues to increase the use of flight simulators, as well as the use of new propulsion technologies in order to lessen the growth of vehicle and equipment fuel consumption.

Increased mission activities accounted for higher levels of operations energy use by some agencies. The Commerce Department's significant increase in consumption during FY 1990 was due primarily to increased miles driven by Census personnel in conducting the 1990 Census. Energy consumption in DOC's vehicles has declined by 73.1 percent in FY 1999 from FY 1990.

Other fluctuations in consumption of vehicle fuels resulted from changes in data collection and reporting procedures. The significant decrease in vehicular fuel consumption compared to FY 1985 reported by the Department of Health and Human Services is the result of data collection difficulties which omitted from their reports fuel consumed by leased vehicles and privately-owned vehicles authorized for Government service after FY 1987. HHS reported no vehicles under the agency's control during FY 1990, FY 1991, and FY 1992.

TABLE 10
FEDERAL ENERGY CONSUMPTION IN VEHICLE AND EQUIPMENT OPERATIONS
(In Billions of Btu, with Conversions to Millions of Barrels of Oil Equivalent [MBOE], and Petajoules [Joule x 10¹⁵])

CIVILIAN AGENCY	FY 1985	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	%CHANGE 85-99	%CHANGE 98-99
USPS	11,524.2	12,136.2	12,196.2	12,225.0	12,565.3	13,348.6	14,571.2	14,217.1	16,779.2	14,777.2	14,583.7	26.5	-1.3
DOT	11,957.0	12,150.8	12,350.7	8,702.6	10,769.7	12,917.0	12,193.7	12,222.9	12,347.9	10,145.0	10,870.5	-9.1	7.2
DOJ	2,064.0	2,097.9	2,124.0	3,675.1	2,835.9	3,451.3	3,181.6	3,693.0	3,149.3	7,171.4	6,456.3	212.8	-10.0
DOI	3,053.9	3,352.5	3,208.6	3,819.1	3,507.8	3,970.0	2,782.2	1,347.5	2,943.7	2,679.9	3,661.4	19.9	36.6
USDA	4,319.6	4,952.3	5,123.8	4,982.7	4,931.2	5,129.1	4,821.7	4,654.8	3,153.0	3,389.4	3,337.9	-22.7	-1.5
TRSY	2,155.0	1,473.2	1,655.7	2,065.2	2,420.9	2,161.8	1,773.4	1,350.9	1,561.4	2,078.6	2,120.5	-1.6	2.0
DOE	2,882.0	2,520.4	2,559.7	2,078.1	2,241.3	2,085.9	1,841.9	1,561.0	1,971.0	1,955.6	1,444.6	-49.9	-26.1
NASA	1,972.7	1,736.7	1,864.0	1,875.4	1,798.0	1,734.9	1,757.0	1,539.3	1,622.1	1,428.3	1,412.8	-28.4	-1.1
VA	592.8	518.3	317.4	634.9	663.9	374.4	353.6	660.7	1,199.1	1,380.3	1,337.6	125.7	-3.1
DOC	1,010.2	3,100.3	1,315.2	952.5	995.7	995.2	760.6	570.1	929.1	708.4	834.5	-17.4	17.8
HHS	373.3	0.0	0.0	0.0	177.3	176.3	105.5	18.6	435.0	447.7	447.7	19.9	0.0
TVA	578.5	476.6	534.7	408.8	452.4	480.3	541.7	583.8	479.5	429.1	423.3	-26.8	-1.4
DOL	232.2	239.0	401.9	388.7	369.1	369.6	356.9	337.7	336.2	350.2	350.2	50.8	0.0
EPA	132.2	0.0	0.0	0.0	100.7	97.8	99.5	76.3	136.8	97.7	120.5	-8.8	23.4
GSA	144.1	128.1	122.6	102.9	79.6	69.9	91.3	98.8	119.9	123.3	102.9	-28.6	-16.6
ST	14.8	34.9	0.0	0.0	7.5	0.0	0.0	0.0	44.7	40.9	40.9	177.0	0.0
HUD	0.0	0.0	32.7	33.6	31.6	30.7	25.4	25.4	28.3	23.3	23.3	0.0	0.0
FCC	12.4	9.1	7.2	7.5	7.2	6.6	6.6	4.8	7.1	6.6	6.6	-46.7	0.0
OTHER*	39.2	69.6	27.6	113.6	106.7	105.4	119.6	116.9	140.1	147.6	144.0	267.1	-2.4
CIVILIAN AGENCIES TOTAL	43,588.4	45,649.7	44,420.7	42,765.2	44,746.7	48,193.3	46,250.1	43,909.3	48,150.2	47,380.6	47,719.4	9.5	0.7
DOD	890,679.9	881,345.1	926,033.6	740,357.2	727,887.1	674,597.5	640,893.4	631,202.0	617,235.4	579,959.8	559,785.8	-37.2	-3.5
ALL AGENCIES TOTAL	934,268.3	926,994.8	970,454.3	783,122.4	772,633.7	722,790.8	687,143.4	675,111.3	665,385.6	627,340.3	607,505.2	-35.0	-3.2
MBOE	160.4	159.1	166.6	134.4	132.6	124.1	118.0	115.9	114.2	107.7	104.3		
Petajoules	985.6	977.9	1,023.8	826.2	815.1	762.5	724.9	712.2	702.0	661.8	640.9		

DATA AS OF 10/26/00

*Other includes for certain years the CFTC, CIA, FEMA, HUD, NSF, NRC, OPM, and USIA.

Note: FY 1998 data was used to estimate the non-tactical vehicle component of agency energy consumption for FY 1999.
Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

FIGURE 10
Defense and Civilian Energy Consumption in
Vehicles and Equipment by Fuel Type, FY 1999

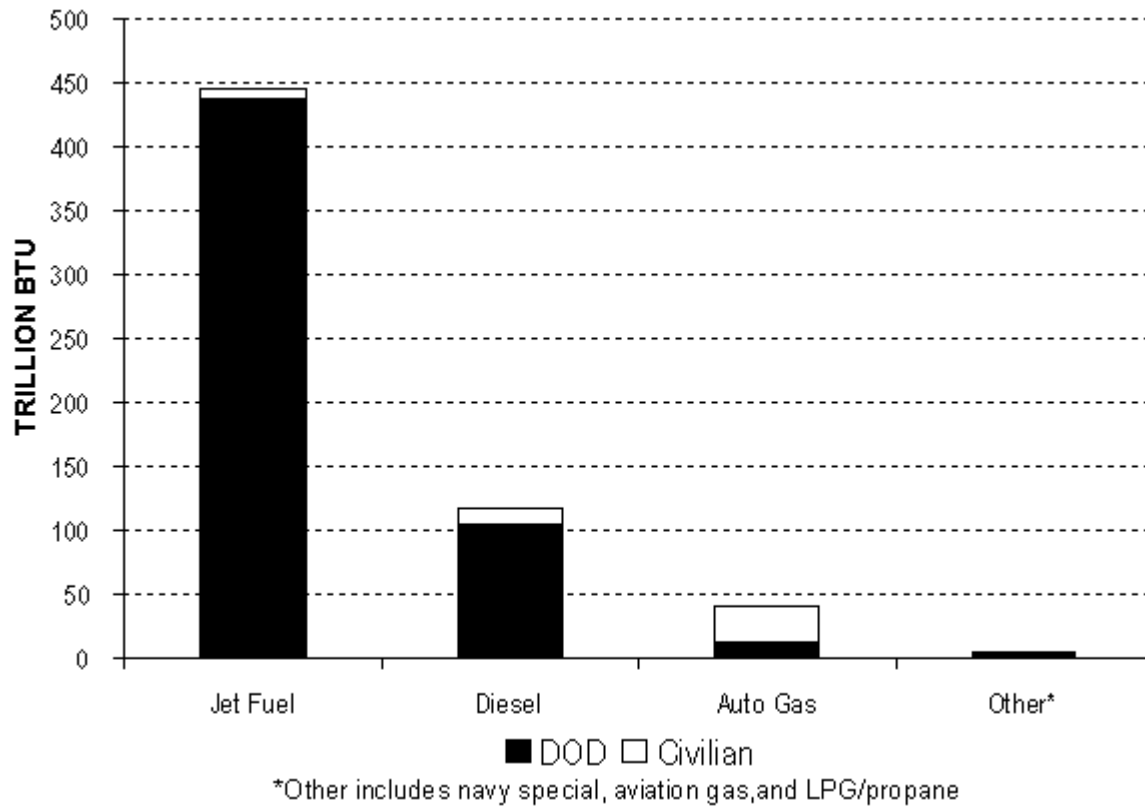


Figure 10 depicts the vehicles and equipment fuel mix within DOD and civilian agencies. Jet fuel accounts for 444.7 trillion Btu or 73.2 percent of the total energy usage in the category, with 19.2 percent attributed to diesel and distillate fuel, 6.8 percent to auto gasoline, and 0.9 percent to aviation gasoline, navy special, LPG/propane and other fuels, combined.

As shown in Tables 11-A and 11-B, the Federal Government spent \$3,908.0 million on vehicles and equipment energy in FY 1999, 11.2 percent less than the FY 1998 expenditure of \$4,400.4 million constant dollars. In FY 1999, the combined price for all types of vehicles and equipment energy was \$6.43 per million Btu, down 8.3 percent from FY 1998. The average real cost of gasoline to the Federal Government rose from \$1.05 per gallon in FY 1998 to \$1.10 in FY 1999. The unit cost for diesel/distillate fuel declined 10.3 percent while the unit cost for jet fuel fell 9.1 percent.

When compared to FY 1985 using constant 1999 dollars, energy costs for vehicles and equipment decreased 54.2 percent from \$8,528.1 million to \$3,908.0 million in FY 1999. During that same period, the Government's combined cost for vehicles and equipment energy, in constant dollars, fell 29.5 percent from \$9.13 per million Btu to \$6.43 per million Btu.

Vehicle and equipment fuel costs in FY 1999 represent 49.1 percent of the Government's total energy costs of \$8.0 billion.

TABLE 11-A
DEFENSE AND CIVILIAN FEDERAL COSTS FOR VEHICLE AND EQUIPMENT ENERGY
IN FY 1999
(In Millions of Dollars)

	AUTO GAS	DIST. DIESEL	LPG/ PROPANE	AVIATION GAS	JET FUEL	NAVY SPECIAL	OTHER	TOTAL
DEFENSE	121.041	595.346	0.569	0.008	2,799.107	15.725	0.160	3,531.955
CIVILIAN	240.367	69.273	0.078	1.807	61.156	0.002	3.397	376.080
TOTAL	361.408	664.619	0.647	1.815	2,860.263	15.727	3.556	3,908.035

AVERAGE COST PER UNIT, BASED ON REPORTS FROM AGENCIES

AUTO GAS = 1.10 / GALLON
DIST/DIESEL = 0.79 / GALLON
LPG/PROPANE = 0.78 / GALLON
AVIATION GAS = 1.70 / GALLON
JET FUEL = 0.84 / GALLON
NAVY SPECIAL = 0.48 / GALLON
OTHER = 8.31 / MILLION BTU

DATA AS OF 10/26/00

Note: FY 1998 data was used to estimate the non-tactical vehicle component of agency energy costs for FY 1999.
Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

TABLE 11-B
CONSUMPTION AND COSTS OF VEHICLE AND EQUIPMENT
ENERGY BY FUEL TYPE IN FY 1999, FY 1998, AND FY 1985
(Constant 1999 Dollars)

ENERGY TYPE	BILLIONS OF BTU	COST PER MMBTU	COST (IN MILLIONS OF DOLLARS)
FY 1999			
AUTO GASOLINE	41,065.5	8.8008	361.408
DIST/DIESEL	116,575.0	5.7012	664.619
LPG/PROPANE	79.2	8.1776	0.647
AVIATION GASOLINE	133.4	13.6105	1.815
JET FUEL	444,680.1	6.4322	2,860.263
NAVY SPECIAL	4,543.9	3.4611	15.727
OTHER	428.1	8.3067	3.556
TOTAL	607,505.2		3,908.035
AVERAGE COST PER MMBTU = \$6.433			
FY 1998			
AUTO GASOLINE	43,050.5	8.3733	360.471
DIST/DIESEL	132,313.3	6.3525	840.524
LPG/PROPANE	393.0	9.9326	3.904
AVIATION GASOLINE	209.9	14.3325	3.009
JET FUEL	445,520.3	7.0794	3,154.017
NAVY SPECIAL	0.0	0.0000	0.000
OTHER	5,853.3	6.5793	38.511
TOTAL	627,340.3		4,400.436
AVERAGE COST PER MMBTU = \$7.014			
FY 1985			
AUTO GASOLINE	50,420.0	10.6290	535.916
DIST/DIESEL	169,215.0	8.4857	1,435.895
LPG/PROPANE	149.2	9.8609	1.471
AVIATION GASOLINE	1,882.3	15.7075	29.565
JET FUEL	705,675.5	9.1698	6,470.828
NAVY SPECIAL	6,687.7	7.8695	52.629
OTHER	238.6	7.5864	1.810
TOTAL	934,268.3		8,528.115
AVERAGE COST PER MMBTU = \$9.128			

DATA AS OF 10/26/00

Note: FY 1998 data was used to estimate the non-tactical vehicle component of agency energy costs for FY 1999. Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

B. Alternative Fuel Vehicles

An alternative fuel vehicle (AFV) can be manufactured as an AFV or converted to an AFV as either a bi-fuel, flexible fuel, or dedicated vehicle. A bi-fuel vehicle has the ability to operate on either an alternative fuel or gasoline, whereas a flexible fuel vehicle has the ability to operate on a mixture of alternative fuel and petroleum-based fuels. Dedicated vehicles are designed to operate only on alternative fuel. The alternative fuels currently used by Federal agencies are: M-85 (85 percent methanol, 15 percent gasoline), E-85 (85 percent ethanol, 15 percent gasoline), CNG (compressed natural gas), LNG (liquefied natural gas), LPG (liquefied petroleum gas), and electricity.

The U.S. Postal Service continues to operate the largest CNG fleet in the country. Since 1989, 7,678 vehicles have been converted to compressed natural gas. Most USPS AFVs are dual-fueled (gasoline and CNG). USPS acquired two electric vehicles in FY 1998 in joint efforts with the Department of Energy and under contract with Ford Motor Company and General Motors Corporation-Hughes. USPS engineering staff, in cooperation with other Federal agencies and private industry, continues to evaluate electric and alternative fuel technologies as they become available.

Section 308 of Title III of EPACT, 42 U.S.C. § 13217, requires agencies to measure the aggregate percentage of alternative fuel use in dual-fueled vehicles in their fleets. In an effort to better fulfill this reporting requirement, vehicle fleet managers and representatives from DOE, GSA, and other agencies conducted coordinating meetings during FY 1996 on this issue. These meetings resulted in a revised GSA Agency Report of Motor Vehicle Data (form SF-82) for collecting acquisition, fuel consumption, and fuel cost data for non-tactical motor vehicles. The revised SF-82 was distributed by GSA to agency fleet managers beginning in FY 1997. GSA compiled this data for FY 1998, including alternative fuel consumption data reported under Sections 303 and 308 of EPACT, and forwarded this information to DOE for inclusion in the Annual Report to Congress for that year. GSA was unable to provide FY 1999 fuel consumption data for non-tactical motor vehicles in time for the publication of this report. FY 1998 data was used to estimate the non-tactical vehicle component of agency vehicles and equipment energy consumption and costs.

During FY 1998, compressed natural gas (CNG) comprised the largest portion of alternative fuel consumption with 91.7 percent. An ethanol and gasoline blend (E-85) is the second most consumed alternative fuel with 6.5 percent.

The Department of Energy has made efforts to provide the private and public sector with information on issues concerning AFVs. An Alternative Fuels Hotline (1-800-423-1DOE) was established in June 1992 to provide callers from Federal agencies, industry and the public with answers to questions on AFVs. By calling the toll free number, callers can request information on AFVs.

The Alternative Fuels Data Center (AFDC), which is located at the National Renewable Energy Laboratory (NREL) in Golden, Colorado, may be accessed by the public on the Internet at <http://www.afdc.nrel.gov>. The AFDC is the central repository for data from DOE's alternative

fuel vehicle demonstration programs. The AFDC stores data on demonstration programs that receive funding support authorized by the AMFA of 1988. Information collected and provided by the AFDC includes:

- data on 600 government fleet vehicles;
- refueling site information for CNG, LPG, Ethanol, and Methanol;
- information on emissions, mileage, fuel economy;
- information on emissions, for flexible fuel vehicles running on alcohol fuels and gasoline;
- repair and maintenance logs for alternative fuel fleet vehicles;
- heavy duty and transit bus data on performance, emissions, fuel economy, and mileage;
- data on the Clean Fleet Program - run by Federal Express and South Coast Air Quality Management District (a controlled comparative study of operating data from gasoline vehicles and different types of alternative fuels).

Federal efforts to expand deployment of AFVs were boosted by the Clean Cities Program during FY 1999. The Clean Cities Program, initiated by the DOE in September 1993, is a voluntary program designed to increase fleet vehicle alternative fuel use by encouraging partnerships between fuel suppliers, vehicle manufacturers, fleet managers, and Federal, State, and local government agencies. DOE supports Clean Cities participants through the placement of Federal vehicles and by maintaining a national hotline and a support staff member at each of its ten regional support offices, which provide local assistance concerning Federal and State requirements for AFV acquisitions and conversions and assist local Clean Cities with their alternative fuels market development. In 1999, 10 new cities were awarded the Clean Cities designation, for a total of 79 Clean Cities. DOE has established a number to handle inquiries from cities interested in joining the program: 1-800-CCITIES. The program's Internet address is www.ccities.doe.gov.

This page intentionally left blank.